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OF

FORESTRY,

AGRICULTURE, SHIKAR & TRAVEL.

EDITED BY

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Indian Woods for Tea Boxes.

X

(To be substituted for ERRATA slip of October Number.)

ERRATA.

JULY, 1892.

Page 258, line 19, *for* 'except to proven' *read* 'except to approved'
Page 262, last line but three, *for* 'advertising it' *read* 'advertising ordinary trade turpentine'
Do. „ last line but one, *for* 'new' *read* 'now.'

AUGUST, 1892.

Page 285, line 2, *for* 'W. Buurman, Forester,' *read* 'W. Buurman, Inspector-General of Forests in Netherlands India.'
„ 298, „ 25, *for* 'Hotgat' *read* 'Hatgat'
„ „ 33, *for* 'Atlur' *read* 'Attur'
„ „ 35, *for* 'India' *read* 'Nidta'
„ „ 40, *for* 'Kirajpet' *read* 'Virajpet'
Page 302 „ 24, *before* 'in appearance'
add „ 'Now we come to the Nandi, and though there seems to be an undefined idea that'
line 28, *for* 'Mattis' *read* 'Nandis'
Page 323, line 19, *for* HERZEGOVIAN' *read* 'HERZEGOVINA'
„ 327, last line, but one, *for* 'radish' *read* 'reddish'
last line *for* 'Sissue' *read* 'Sissu,' and before it *insert* 'or.'

We regret that we should have made the mistake as to the rank of Herr Buurman. In the original Dutch the word was 'Houtvester' which really corresponds to 'Conservator of Forests.' It was translated 'Forester' and as in some of our colonies 'Forester' and similar terms are often used, we believe, for officers of some rank, we did not notice the mistake. Herr Buurman is now Inspector General of Forests in Java and Madura.

OCTOBER, 1892.

Page 376, line 25, *for* ',Garuga, pinnata' *read* 'Garuga pinnata'
„ 381, „ 21, *for* 'contral' *read* 'control'
„ 408, „ 26, *for* 'T. C. Moss' *read* 'S. C. Moss.'

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THE

INDIAN FORESTER.

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The Andamans.

A few years ago the Andamans were spoken of vaguely as a group of small islands somewhere in the Bay of Bengal, on one of which there was a penal Settlement called Port Blair, to which the Indian Government found it convenient to transport its least promising subjects Of late years, however, the Settlement has become better known. The Asiatic Steam Navigation Company have made their "round" run between Calcutta, Port Blair, Rangoon and Madras, a popular one, with numbers of people who like a breath of sea air, or who need it So that Port Blair has begun to have plenty of visitors, who make the usual inspection of the Settlement, interview the curious little Andamanese, and then go away to tell their friends in India 'ALL' about the Andamans. But one of the chief causes of the growing importance of the Andamans they seldom discovered. This is the establishment of a flourishing trade in Padauk Timber (Pterocarpus indicus) by the Forest Department. The rapidly increasing export of timber (now including other species besides Padauk) from these islands, must give them a high place amongst timber-producing countries in the near future; so foresters in India and Burma may like to have a sketch of the forests, and of the Settlement generally.

Although, hitherto, the Andamans have been, as a Forest Division, administered by the Government of India, for the sake of convenience, they naturally belong to Burma. Geologists say that the Aracan Yoma (N. B "Yoma" is the Burmese for spine, and when applied to natural features of the earth's surface means a hill range, the spurs being considered as ribs) once ran as far as south latitude 10°30′———, but in company with the continent which is supposed to have subsided here long ago, a great part of the Yoma went under the sea, leaving only a few of the highest peaks above water in the form of islands. The position of the Andamans, and the fact of the soil formation being absolutely the same as that of the Aracan hills, seems to prove this theory

completely. The islands so left, form one of the prettiest groups in the Indian Ocean. To climb a hill and gaze on the confusion of forest clad spurs dipping into the blue sea, fills one with a sense of mingled wonder and pleasure. Looking closer, the scenery affords some variety in the winding inlets of the sea which lead to the mouths of tidal creeks, flowing through dense forests of mangrove, from the valleys farther inland.

The Forests.

The Mangrove swamps are like such swamps elsewhere, except that the trees seem to be of better growth, and the presence of palms (Calamus, Wallichia, Areca, &c.), Screw Pines (Pandanus) and occasionally Mimusops littoralis, on the inner fringes of the Mangrove, causes in part the tendency to sameness in the scenery. The rising ground from the edge of the swamps up to the highest ridges, is covered densely with high forest. Gurjan (Dipterocarpus tuberculatus) and D. alatus) Burmese "Kanyiu" are the best represented species of tree. The immense white stems of these trees tower over the rest of the forest, often reaching the height of 150 feet or more. A step lower than the tops of the Gurjan giants, but still quite a hundred feet from the ground, is the general canopy, formed by the crowns of such species as Padauk, pyinma (Lagerstroemia hypoleuca), Artocarpus Lakoocha, Croton argyratus, Amoora, Baccaurea sapida (Burmese Kanaso'), Myristica Irya, Hopea odorata, Mesua ferrea, Albizzia Lebbek, Murraya exotica, and Podocarpus bracteata, the four last being found more inland. Casuarinas grow in fringes on the sandy parts of the coast. Bamboos are not common. There are only two kinds, one being a relation of the Burmese 'Wathabwot' a straggling climber slightly ornamental but of no use. The other is probably Bambusa schizostachyoides. The culms are straight and spineless, but small and very hollow. The clumps are graceful; and when planted along the sides of roads this bamboo makes very pretty avenues.

The character of the forest seems to have originally been the same as that of some of the commoner types of forest in Burma (particularly those on the lower hills of Tenasserim). But changes have taken place since the isolation of the Andamans and in spite of the large number of trees like Padauk, pyinma, gurjan, gangaw (*mesna ferrea*) and others which are common to both Burma and the Andamans, the absence of some Burmese species and the presence of others which have not their equivalent in Burma, give rise to much doubt concerning the relations orginally existing between the forests of the islands and those of the main land

A marked feature of the forests of the Andamans is the compactness of the canopy everywhere. Only the most shade-enduring species are able to reproduce themselves. Padauk (the

principal timber tree) and other light loving species are fast dying out, as the seedlings invariably succumb after struggling for a year or two in the gloom. Only very old trees of Padauk are to be found, excepting a few young trees which have lately grown up on the sides of road or other artificial clearings. Whether Padauk originally grew all over the islands or not, it is now confined to certain soils, and within certain limits which are probably determined by elevation and aspect, but this is not certain. The Dipterocarpeæ and many others of the characteristic species grow everywhere, whatever the soil or aspect may be.

Forest glades do not exist, and this is one explanation of the fact that there are no wild animals in the islands, excepting pigs, and a species of wild cat (Paradoxurus Andamanicus.) This is a case in the struggle for existence, where vegetable has gained the mastery over animal life. Iguanas, lizards and snakes are common. Forest birds, especially parrots and king-fishers, abound. Game birds are rare and belong to migratory kinds such as teal and snipe. The Andamanese, who have survived with the cats and pigs, have made no more impression on the forests than the latter, as they appear to have never had any idea of cultivating the soil, and so have never made any clearings. They are an interesting people, notwithstanding their primitiveness, and if their story is likely to please, it can easily be told some other time.

Such a green country, situated in the middle of the sea, must necessarily have a moist climate. Old residents say that the rainy season in the Andamans lasts from May to December. This proves to be the case, only the chances are that the season, from accidental atmospheric changes, sets in a month early and lingers on for a month longer than it is expected to.

Under these conditions, it is useless to try and distinguish between the wet and dry seasons with respect to choosing a suitable time for outdoor work. Felling and extracting of timber, loading of ships, and general inspection is equally agreeable at all times of the year, so work is carried on continuously. Over six hundred convicts and 24 elephants are engaged in the forests to bring timber to the forest depôts, from which the timber is exported, to some extent by cart, but mostly by a very successful tramway, to the various sale depôts on the water. Most of the woods named above are taken up largely for local works by the Settlement Officers, excepting Padauk which is used sparingly in the Settlement and is reserved for export to India, to Burma, and chiefly to London. Of late years, nearly 200 tons of Padauk timber have been disposed of annually in London with considerable profit. The demand is growing, as the timber is finding American buyers, and might be developed indefinitely if the resources of the Andamans permitted a larger export, but it is not certain yet whether the forests can safely be made to yield more than 2,000 tons a year besides the 400 or

500 tons that go to India and Burma. Dark-colored wood is always sent to London as it is used for cabinet work; the light-colored Padauk is disposed of in India, where color is no object, but the aim of the purchaser is to get strong solid timber for making gun carriages, or railway cars. Besides coloured Padauk, the Andamans forests produce other good fancy woods, the best known of which are marble wood (Diospyros Kurzii), and Satin-wood (Murraya exotica.)

The following table will give an idea of the revenue made by the Department. Besides this, and a small profit made by the sale of tea from the local tea plantations, the Local Government gets no appreciable revenue.

	Receipts.	Expenditure.	Net.	
1889-90	162,195	94,975	67,220	
1890-91	158,325	130,052	28,273	
1891-92	272,338	179,908	92,430	
1892-93	303,000	209,000	94 000	Estimate.
			70,481	Average.

The peculiarity (noted above) of the Padauk not being able to hold its own against more shade-enduring species, makes it imperative to help the former by the usual artificial means. So the Forest Department does its best by clearing around seed bearers, in the forest to be worked over, and by planting largely over areas that have been exploited, to ensure the reproduction of Padauk; while similar measures are to be adopted, when practicable, for other valuable species which need protection from their neighbours.

A plantation of Padauk was started in 1883 and new plantations or extensions have been made regularly ever since then except in 1888. The system at first was to make large clearings and plant these up with Padauk, or with Padauk and teak in alternate lines. But a better method was soon adopted for Padauk, that is, planting in lines 20 feet wide cleared through the forest. This method is to be followed in future in planting teak also, or any other species.

The Padauk plantations have always been successful. A few words about teak, which has been planted for the sake of experiment, will be interesting. Mr. Ferrars started planting teak in 1883, and his experiments were continued by Mr. Carter. Planting over areas clean felled, and also in lines through the

forest was tried with more or less success. The plantations in the clearings are the best at the present time, but this is most likely due to the saplings in the lines having been crowded by weeds and so kept back. In future, it is intended to plant teak in alternate lines with Padauk, through the forest. The lines are to be 15 or 20 feet wide, and 100 feet apart, and the area to be planted over to be as nearly as possible half a square mile.

The teak in the oldest plantations, which are situated in an open valley (Gopalakabang) about 6 miles from the sea, is as well grown as that in most plantations in Burma. Trees ten years old are beginning to pass out of the small pole stage already. They are straight and of good girth. The only noticeable feature in their growth is a tendency for the bark to get dry and hard in the hot weather and so to retard expansion. But this will probably not occur when planting is done in the forest and some shelter secured from the sun by the presence of evergreen trees between the lines.

The late cyclone thinned the older parts of the Gopalakabang plantations severely. The injured boles are being coppiced with very good results however. In the younger parts of the plantation the saplings escaped injury. There are several irregular plantations of teak in the station more or less full of well grown young trees, and there is a broken line of teak on one side of the harbour which is within reach of the spray of the sea in rough weather. The progress of the latter will be very interesting to note. Before concluding the remarks on plantations it may be noted that the Dhani palm (Nipa fruticans) has been successfully introduced into some of the tidal creeks by the Department affording a great deal of the thatch used for roofing temporary buildings.

As a residence, Port Blair is considered, at least by those who are obliged to stay here, as a very pleasant little place. Visitors pretend to find some drawbacks to life in the Settlement, but then they have not had time to form a correct opinion on the subject.

There is not hot weather, as it is understood in India. But there is no cold weather. The climate is lukewarm, and though healthy it is very enervating. People get on from day to day in a sleepy way which is very pleasant after the restless turmoil of busier places. But they wake up occasionally when the mail Steamer comes in, or when a man-of-war or a general inspecting officer visits the Settlement; and then for a few days, a surprising amount of business, as well as gaiety, is got through. In addition to the usual amusements, those who are inclined that way might try their skill at the slightly risky, but very enjoyable pastime of sailing.

Port Blair has no fruits, no pretty meadow flowers, or vegetables to induce people to garden; and so, unfortunately, there are none of those pretty cool retreats which are such a

pleasant feature in most Indian stations, but there are instead open grassy downs diversified by hedges of Vitex and Agave, Croton and Hibiscus, and groves of lofty Casuarinas. The rich and varied profusion of the Crotons and Shoe flowers gives exceedingly lively, but pretty, coloring to the scenery, and a ride across country affords at least as much pleasure as a drive through almost any garden in India. There are two favourite holiday resorts close to the station,—Corbyn's Cave on the east coast, and Mount Harriet a hill just over a thousand feet high on which the Government has very considerately built and furnished a Rest House for the benefit of over-worked officers and invalids.

E. M. B.

The condition of Forestry in New Zealand.

The following extract from the letter of a correspondent of the *Pioneer* will be interesting to our readers as shewing the present state of things in New Zealand in respect to Forest Conservancy. We suppose that as soon as all the natural forests have been destroyed, the next turn of the wheel will once more bring Forestry to the front with extensive planting works and heavy expenditure to retrieve what ought never to have been lost. It will be a thousand pities if every remnant of the magnificent Kauri Forests is swept away in the anxiety for new sheep lands.

"There was a lovely view of the hills through which the 'beautiful Manawatee Gorge winds, the entrance to which was 'just in front of us. These hills are covered with dense bush, 'which has been selected as a forest reserve by Government but '—alas!—since then I hear it has been unable to resist the 'pressure brought to bear on it by a people hungry for land, 'and this belt of forest which in a few years, when the settler has 'stripped all the country round of timber, and burnt it to lay 'down the land in grass, would have been of great value, is 'deemed to axe and fire. Several men whose views should carry 'weight, have told me that, in their opinion, good bush land, 'fairly situated as regards communications, would, if retained as 'forest for the sake of the timber, give a better return by the end of '20 years than if it had been grassed and fed with sheep or cattle. 'At present timber is looked on in the light of a noxious product 'of the soil, to be destroyed as rapidly and effectually as possible, 'but the time must come when it will have a considerable com-'mercial value. Sometime back, Government had men as minis-'ters far seeing enough to recognise this, and forest reserves were 'created, to save a certain amount of timber, but the working-'man, who cannot see beyond the length of his nose, is now Lord 'Paramount of New Zealand, and he cares for nothing beyond the 'immediate present."

Tour of the Coopers Hill Students in France.

Last year the students of the English Forest School under the able direction of Dr. Schlich and Mr. Fisher, one of our first foreign comrades at the "Ecole" at Nancy, came to visit the splendid high forests of the Forêt de Lyons. Encouraged by his first visit, Mr. Fisher wished this year not only to show his students the dense crops which make the forest of Lyons an unrivalled beech forest, but also to study in detail the organization of the Working Circle and the application of the Working Plan during the last few years A thorough and careful teaching had well prepared these young men for appreciating the treatment as well as the beauty of the crop they inspected during the course of the week they spent there.

The forest officers of Lyons have been pleased to serve as guides to such intelligent students and they were proud to find again in them French forest traditions become international. They are confident that this visit will leave with their guests the pleasant remembrances that they themselves have kept of it, and will help to draw closer those bonds of brotherhood formed now long ago under the influence of the hospitality of Nancy.

The English School went on afterwards to see the forests of the Perche which had also been visited in the previous year. From the 21st to the 25th of July, twelve of the senior of the students under the guidance of the amiable Professor of sylviculture, Mr. Fisher, studied the magnificent high forests of oak of Bellême, Perche-la-Trappe and Réno-Valdien, the local forest officers rendering them ready and willing assistance.

The forest of Bellême is the classical land of the oak as the forest of Lyons is that of the beech.—*(Révue des Eaux et Forêts Translation).*

A great day at the Forest School at Nancy.

On the 6th of June last, the Forest School at Nancy was visited by the President of the French Republic who had gone to Nancy for the fêtes of the 18th Congress of the Gymnastic Societies. The visit to the School did not form part of the original programme and it was only within a day or two of his arrival that M. Puton, the Director, was made aware of the intention of the President to spend a short time at the School, this change in his plans having been brought about by the intervention of the deputies and senators of the Department, Professors and students at once set to work to prepare for his reception, and though the time at their disposal was short, the result appears to have been very satisfactory.

An enormous arch of triumph was constructed under the direction of Messrs. Thièry and Petitcollot, out of two large Silver Fir trunks, broken across the middle, covered with mosses, flags and inscriptions, decorated with the heads of wild animals, &c. and erected in the Rue de la Constitution. The Rue Girardet was also decorated for the occasion.

Messrs. Puton, Lamblé, and Boppe, received the President and suite at the outer gate of the School : and, after the usual presentations, the President was conducted to the great courtyard where M. Puton delivered a short address expressing his satisfaction at the mark of attention thus shown to the Forest Department and referring to various points in which the Republic had shown itself more favourable than any other form of Government, to forest interests. After Mr. Carnot's reply to this address, the students marched past under the command of Lt.-Colonel Montignault. Then other parts of the School, the museum &c. were visited, and the President was finally escorted to his carriage, the students being drawn up in two files to salute him on his departure. It is not often that the Forest School has the honor of receiving the Chief of the State. Let us hope that the ceremony will add to the already great prestige of the Department so ably managed by our French comrades of the Nancy Institution.

Grazing and Commutation in the C. P.

The supplement to the C. P. Gazette of the 6th of August last, contains a Resolution by the Chief Commissioner on certain questions which were laid before the Forest Committee, which sat in Pachmarhi in April, 1891. In this Resolution, the Chief Commissioner orders the tentative adoption of commutation as applied to the pasturing of cattle in lieu of the old system under which we believe that each individual took out a license for the number of cattle he wished to pasture. In future, the Mukaddam of the village will submit a statement of the grazing requirements of the village and a consolidated license will be issued for that village, the Mukaddam collecting the necessary fees. Provisionally, the commuted payment will be reduced 10% under the aggregate which the payments for the village would reach if each individual had to take out a license separately.

A further concession has also been made in favour of those owners of cattle wishing to graze in districts other than that in which they reside by authorizing the issue to such of a nomad license such as has hitherto, it appears, been reserved for Banjaras, Beparis and other similar nomadic owners of cattle, the rates for such licenses being a little in excess of the ordinary district rates.

It appears that the substitution of a system of annual commutation for other forest produce as well as grazing, instead of the present license system, was proposed, but the Chief Commissioner, we are glad to see, has rejected this proposal which would surely have been a step backwards instead of one of progress.

We are inclined to think that the remedy for, at any rate, some proportion of the difficulties in connection with Nistar, might be sought elsewhere than in the Government Forest Rates; The abuse of Malguzari Forest Lands is a matter which has however also received the attention of the Chief Commissioner, and should the Rules in respect of these be carefully carried out, they should in time, where such lands exist, help to alleviate some of the troubles complained of by the cultivators.

A currency of one week for all licenses for the extraction of forest produce has for the present been prescribed, which as the Subordinate Forest Staff is to be increased, may not lead to so much loss as it otherwise would in those cases where the removers of produce live near the Forests and the Forest Guard's beat is too large to allow of his checking all the produce removed; as it will be a great temptation to removers who have conveyed their produce from the forest without check to return again and again so long as they are provided with a pass that is still valid.

II.—CORRESPONDENCE.

Forest and other Civil Officers in Bombay and elsewhere.

SIR,

The article on Forest and Revenue Officers in the October number of the "Indian Forester" appeared opportunely with the reprint of Bombay G. O. No. 7107 dated 6th September, 1892, in that number; your readers have thus the opportunity of learning how matters are to be managed in the west of the peninsula, how they are managed in other parts of India and on what general basis the relations between Forest and Revenue Officers should, in your opinion, stand.

The principles adopted by other Governments than that of Bombay are briefly that the Chief District Officer is responsible

for the management of the forests in his district, the Divisional Forest officer being his Assistant in Executive matters; that the entire control of finance and establishment rests with the Conservator who further addresses all recommendations for the working of the forest, through the Revenue officers for an expression of opinion, direct to the Local Government; in short, that the District Forest officer should not be exposed to interference from the departments but "under the Collector's orders and supervision carry out the instructions of the Conservator."

The regulations issued on this subject by different Governments must of course vary in detail, but they agree in maintaining the authority of the Conservator, in permitting a proper amount of patronage, of making him the representative of Forest interests, and enabling him to present his opinion and advice on forest matters to the Local Government, whilst they lay the responsibility of the finance of the Circle entirely on the chief forest officer. These principles are sound and have stood the test of many years working, for by these means the interest of the District Officer in his forests is aroused, the position of the Divisional Officer is strengthened, and the Local Governments are in the best position for deciding any questions of administration when placed in possession of the views of the Forest and Revenue officers concerned.

Let us now consider the principles adopted and the regulations issued by the Government of Bombay in the above quoted Notification. These rules, 28 in number, profess to be for the purpose of prescribing and limiting the powers and duties of Forest Officers under Act VII of 1878, but would appear to an outsider designed rather to limit the powers of the Forest Officer and prescribe the duties of other Civil Officers. A careful search fails to show that the Forest Officer is empowered to do anything but carry out the orders of the Collector; whilst a Conservator may not refer to Government save in questions of finance and establishment or in the case where he disagrees with a Collector. The regulations may conveniently be divided under three heads: I, paras 1 to 16, treating of the duties and position of Forest Officers; II, paras 17 to 27, treating of the duties of other Civil Officers; and III, the final para, in which the duties and position of Commissioners of Civil Divisions are prescribed. Head I opens with the declaration that Forest Administration is a branch of Land Revenue Administration, and proceeds to place the management of the State Forest in the hands of the Collector, the Conservator only retaining the direction of "professional operations of technical forestry" and subject to the sanction of the Local Government, departmental finance and control of Forest Officers. Paras 6 and 7 place the entire control and patronage of the Subordinate Establishment in the hands of the Collector; 8 and 9 remove the question of local supply of produce and of rights and privileges not only from the

control but from the cognizance of the Forest Officer; 10 and 11 regulate correspondence between Conservators and Forest and District Officers and provide for the revision by the Collector of the Conservator's orders to his subordinates; whilst 11 to 16 empowers the Collector to deal with yearly plans of operations, but only obliges him to forward to the Conservator copies of such plans as may have met with his approval.

Under head II, paras 17 to 20 regulate the inspection of Range Offices by Revenue Officers and the procedure to be adopted in correspondence by Forest Officers; paras 21 to 22 detail the method to be adopted in exploiting compartments; and the following five rules prescribe the powers of Head Constables and other Civil Officers in the inspection of forests. Head III, the final para, gives unlimited power to Commissioners who may interpret Government Orders, settle all departmental differences of opinion, and refer to Government or decide as they think fit on reports on forest matters submitted to them.

The first thing that strikes the reader of these rules is that the Conservator, except in the direction of "professional operations of technical forestry" (one feels that that phrase cannot be too often repeated) or in questions of departmental finance has no voice whatever in the local management of his forests: he is indeed invested with the Departmental Control of Forest Officers, but as he can appoint or post no one, and can issue no orders without the approval of the Collector, this part of his duties would not interfere with his leisure; while, as to the working of the forests of his Circle, he can read the plans of operations approved of by the Collector and leave that official to carry them out. A further study of the rules inclines the reader to the opinion that not only is there no need for Conservators, but also that Divisional Forest Officers are not a necessity in the forests under the Government of Bombay. The Collector arranges all forest matters, sometimes with and sometimes without the knowledge of his district forest officers, who moreover may not correspond directly with their superior officer. The inspection of Range Offices is carried out by subordinate revenue officials, whilst Foresters and Forest Guards may be officially inspected by all and sundry, from a constable upwards. It appears almost superfluous to retain a special forest officer to add to the pile of information collected by subordinates of other departments who presumably forward their reports through their immediate superiors to the Collector.

It is presumable, from rules 9 and 21, that all the forests of the Bombay Presidency are not yet under the prescription of duly sanctioned Working Plans, so that a small number of forest officers have still some reason for existence under that Government. In any case, the provisions of rule 22 will no doubt act as a spur to Conservators in the matter of keeping their fellings up to date, for any delay in carrying out these

'professional operations of technical forestry' may be speedily avenged by converting them into amateur operations of self-interested destruction! It seems somewhat severe that *necessary* delay in felling operations should by any possibility result in the sudden withdrawal, at the expense of the forest, of scientific management!

It must, of course, always be, in the absence of local knowledge, difficult to criticise forest regulations, but the position of forest officers in Bombay would appear to be so very peculiar, and the work exacted and responsibility imposed under these new rules so very insignificant, that the following suggestions are made and may be taken for what they are worth.

i.—That from the date of the issue of G. O. No. 71 all Bombay Forest Officers should be retired on full pension with the exception of a few officers specially selected to form a new Forest Department.

ii.—That this new Forest Department shall consist of a chief forest officer with a suitable staff under his exclusive control whose duties would be confined to the compilation of Working Plans and to the direction of "professional operations of technical forestry."

iii.—That the entire management of the State forests should be vested in all revenue and police officers of and above the rank of Head Constable under the immediate supervision of the Collector, who would be personally responsible that the terms of Working Plans were strictly carried out.

iv.—That no Collector should be permitted to assume charge of a district until he had passed a searching examination into his knowledge of Forest Law, the utility of Forests and the Principles of sylviculture. In this Examination the private opinions of the examinee should not be accepted if at variance with acknowledged authorities on the subject.

The above suggestions may appear to be dictated rather by humour than by common sense, but to this it may be replied that the existing regulations appear to be influenced by neither the one nor the other! At any rate, the proposals made would be acceptable to most Bombay forest officers, whilst the working would be followed with interest from happier Provinces by many a

"PROFESSIONAL OPERATOR."

The Bombay Administrative Rules.

SIR,

In the "Extracts from Official Gazettes," appended to your October issue, appears an order (No. 7,107 dated the 6th September 1892) of the Government of Bombay prescribing and limiting the powers and duties of Forest Officers in that Presidency under the Forest Act. The rules purport to have been issued under Section 75 (*a*) of Act VII of 1878; and breaches of the regulations are, it is inferred, punishable under Section 76, which allows of imprisonment for one month, or a fine not exceeding Rs. 500, or both. Accordingly, if, for example, the Collector does not from time to time inspect all the Range Offices of his District; or if Compartments of a Forest block are not felled in regular rotation; or if the Local Forest Officer does not inform the Collector of places where cuttings are to be made; or if a Police Officer does not, on examining a Forest Guard's diary, write the word "seen" with his initials after the last entry, or calls a guard off his beat; or if the Forest Officer fails to submit to his Collector between the 30th June and 15th July, the Plan of Operations, then shall the culpable parties be criminally prosecuted and punished. The Legislature, in its wisdom, has mercifully abstained from providing that in offences of this nature double penalties may be inflicted when the offence is committed at night or after preparation for resistance to authority; or even when a previous conviction for a like offence has been obtained. But the prospect is sufficiently serious as it is, and the only crumb of comfort for the apprehensive Collector or Forest Officer is that Commissioners themselves are liable to incarceration or fine or both, for breaches of Rule 28. The Bombay Government, true to its motto, has been the first to give effect to Section 75 in this manner, but it may be hoped that its example will not be rashly followed by other Administrations!

It will probably be found that the Rules have no legal sanction whatsoever. Except in the preamble (which itself curiously misrepresents the scope of the orders) no section of the Forest Act is mentioned. The Rules do not appear to be Rules under the Act at all, but Administrative Orders of the Local Government, and should have been issued merely as such. The blunder, if blunder it be, is probably unique in the annals of the Forest Administration in India.

PUNJABI.

III.—OFFICIAL PAPERS & INTELLIGENCE.

Forest Fellows of Coopers Hill.

In re-printing the following order of the Secretary of State regarding the admission of Forest Officers who pass out of Coopers Hill as to eligibility for the Fellowship, we wish to express the hope that the authorities will not merely put it in force for the future, but will also admit to the benefits of the new rule such of those who have already passed out as they consider would have earned the distinction, had the Rules been in force in their time.

"I am directed by the Secretary of State for India in 'Council to acknowledge the receipt of your letter, dated the 7th 'July, proposing that a small number of distinguished Forest 'students should be annually appointed "Fellows of Coopers 'Hill," in the same way as Engineer students are now appointed 'under orders passed by the Marquis of Salisbury in 1877.

'2. In reply, I am to state that Viscount Cross sanctions 'your proposal, on the ground that the distinction of "Fellow" 'will be an additional incentive to diligence and proficiency on 'the part of the Forest students. The selection for Fellowships 'should be made by the President in consultation with the Prin-'cipal Professor of Forestry, and not more than two students 'should be selected in any year.

'3. A copy of your letter and of this reply will be forwarded 'to the Government of India, in order that the title of "Fellow 'of Coopers Hill" may be attached to the names of Forest 'Officers gaining the distinction in the official lists, as is already 'done in the case of Engineer Officers who have gained Fellow-'ships.

Joining arrangements for Forest Officers on first arrival.

It has been brought to the notice of the Government of India that, it consequence of orders not awaiting them, on arrival from England, as to the stations to which they should proceed for duty, professionally-trained Forest Officers appointed by Her Majesty's Secretary of State occasionally get two periods of joining-time—*i. e.* from place of disembarkation to provincial head-quarters and from head-quarters to ultimate destination—before they actually enter upon their duties. To prevent, as far as

possible, the recurrence of this unnecessary waste of time, I am directed to say that in future, as soon as intimation is received by the Government of India from the India Office of the dates of departure from England (with names of vessels), and of the ports of landing in India, of the officers posted to the different provinces, the requisite particulars will be communicated, by telegram from this Department, to the Local Governments and Administrations concerned. The latter should thereupon arrange to let the officers expected know, immediately on arrival at the place of disembarkation, the stations to which they have individually been posted and to which they should proceed direct, together with such instructions or information as may be necessary in connection with the journey to such stations.

2. No officers will arrive in India from England this year for the Indian Forest Service, and the arrangements indicated in the foregoing paragraph will therefore, come into force next year.

The Reorganization of the Provincial and Subordinate Services.

Extracts from a Note by the Inspector General of Forests on the reorganization of the Provincial and Subordinate Forest Services, dated 3rd June 1892.

This note deals with the proposed reorganization of the Provincial and Subordinate Forest Services, in so far as this has not already been dealt with by the creation of appointments in the class of Extra-Assistant Conservators, which necessitated the Secretary of State's sanction.

My proposals regarding the reorganization of the Forest Department in India have to a certain extent been based on the present organization of the forest administration in the Prussian monarchy, which had been remodelled on the lines of the French administration, and in close connection with improved means of communication and postal and telegraphic progress.

Under these circumstances, I may perhaps be permitted to sketch briefly the present Prussian organization.

A.—Imperial Administration.—At the head of the forest administration stands the "Oberlandforstmeister." He is a Joint-Secretary to Government (Director of a ministerial branch), and is directly subordinate to the Minister for Agriculture, Settlements, State-domains and Forests in all technical questions and those relating to the forest staff. In questions affecting the agricultural population the cases may be referred to the Minister

by the Secretary in the Department of Revenue and Agriculture (if verbally, as a rule, in the presence of the "Oberlandforstmeister.")

The Director is assisted by a Board consisting of four ordinary members and two deputy-members.

The ordinary members are technically-trained forest officers, and are called, "Landforstmeister" or "Oberforstmeister," according to seniority; they are Under Secretaries in the ministry. The first deputy-member is in special charge of forest settlements and commutation of rights, on account of which latter, an annual minimum expenditure of 2,000,000 marks is provided in each year's budget. He must be either a lawyer by profession, or a forest officer who has passed the examination of an advocate in the Chief Court. The second deputy-member is in charge of working-plans, and must have passed a special examination in surveys and working-plans, in addition to the general examination in these sudjects which is demanded from all officers in the superior service. He has got a separate office, the members of which are selected from among young working-plans officers and surveyors.

The deputy-members rank as "Oberforstmeister" and "Forstmeister," as the case may be. The Director deals direct with all general questions affecting the whole monarchy and with all personal questions, and has the direction of the Board.

The work of the ordinary members is arranged according to groups of provinces.

B.—Provincial Administration.—The officer in charge of the forest administration of a province or circle is called "Oberforstmeister," corresponding to our Conservators. The chief "Oberforstmeister" in a province is Deputy-Secretary to the Provincial Government. There are 29 such posts.

Subordinate to the "Oberforstmeister" are the "Forstmeister," more or less corresponding to our staff of Upper Control. Of these there are 92.

Under these serve the "Oberforsters," corresponding to our Rangers and Extra-Assistant Conservators. There are 679 "Oberforsters," who, in regard to all police administration, are subordinate to the "Landrath" (Collector), but in all technical business to the "Forstmeister." Their average charge is about 17 square miles.

The whole of the account work is done by 388 Accountants, who each deposit a security of £200, and are paid by a percentage subject to a minimum income. Since 1888-89 these officers are gradually being brought on fixed salaries.

The protective establishment consist of 5,208 Foresters and Guards. Permanent mates of working-gangs are sworn in as

special guards, but receive no extra pay on this account. In cases of special necessity, non-commissioned officers and soldiers are detailed for forest protection.

As regards emoluments—

The "Oberlandforstmeister" receives a salary (inclusive of house-rent) of 18,000 marks per annum. When travelling on duty he gets actual travelling expenses, *plus* a daily allowance of 24 marks.

The "Landforstmeisters" receive from 9,900 to 12,000 marks per annum.

The "Oberforstmeisters" draw a salary of 9,000 marks per annum, *plus* a direction allowance of 900 marks which is pensionable.

The "Forstmeisters" are on salaries ranging from 6,500 to 9,000 marks per annum. When moving on duty they receive a daily allowance of 18 marks, *plus* 0·13 of a mark per kilometer when travelling by rail or steamer, 0·60 of a mark per kilometer when travelling by road, and 3 marks on each occasion they enter on or leave either a steamer or the railway.

The "Oberforsters" are paid on an average 3,000 marks, per annum. This pay is pensionable. They also draw a personal allowance of 2,100 marks per annum which is not pensionable, and when travelling beyond the limits of their ranges they are allowed 12 marks a day, *plus* 0·13 of a mark for each kilometer travelled by rail or steamer, and 0·60 of a mark for each kilometer travelled by road, besides 3 marks for each occasion they enter on and leave a steamer or the railway.

The "Forsters" are on salaries ranging from 900 to 1,300 marks a year. Such of them as possess the title "Revier Forster" are granted, in addition, an allowance ranging from 150 to 450 marks per annum, free house, and free firewood averaging in value 297·6 marks per annum. The value of this last grant counts towards pension. When travelling on duty Forsters are entitled to a daily allowance of 3 marks if proceeding by rail or steamer, and of 6 marks if proceeding by road, besides 0·10 of a mark for each kilometer travelled by rail or steamer, and 0·40 of a mark for every kilometer travelled by road.

The "Waldwäérters" (corresponding to our Forest Guards) get from 360 to 660 marks a year, and most of them are allowed firewood for whatever its exploitation costs.

All officers when transferred from one part of the country to another in the interest of the public service are granted compensation.

As regards pensions, the amount admissible is determined, by length of service. After a service of not less than ten years, a pension not exceeding 15/60ths of average salary is admissible.

After ten years' service, the rate of pension increases by 1-60th of average salary each year. The maximum pension admissible on this scale is 45-60ths of average salary.

In the case of classes divided into grades or having appointments on progressive pay, not more than the average pay of the appointment can be taken into account in reckoning for pension. As regards salaries above 12,000 marks per annum, only half the excess is pensionable.

Service begins at 21 years, and every year's war service counts double. All pensions due on account of accidents in connection with the service are fixed at 2-3rds of the salary, independent of the length of service.

In the case of an officer dying, his wife and children, or (with special sanction) other near relatives dependent on him, are entitled to a gratuity equivalent to the pay of the deceased for three months. In the case of an officer who dies with a claim to pension, his widow receives, in addition to the above, 1/3rd of the pension he was entitled to at the time of his death and each of his children 1/9th.

In addition, the State supervises and guarantees insurances managed free of profits.

The average gross income from State forest property in Prussia is about Rs. 6 per acre.

There are several points in our forest administration which I should like to see further assimilated to that of France and Germany, and it will be my constant aim to effect this in the course of time; but, as they are wide of my present purpose, I shall not further refer to them in this note.

The most carefully-trained and selected controlling staff is helpless in regard to an efficient management of the forests entrusted to it, if unassisted by an adequate staff of executive officers—adequate both in numbers and technical knowledge. This fact has been fully recognized by the Government of India; and if I, nevertheless, once more enlarge on the subject, I do so with reference to the too moderate demands for an increase in the executive (especially the Ranger staff,) which some of the Local Governments have submitted, and which will prove to be inadequate before many years have elapsed.

Most of our Indian forests have suffered for centuries from mismanagement, or, if not from direct mismanagement, from neglect. From time immemorial the produce required by the people or by the State had been extracted where most convenient, without regard to the future well-being of the forests. Growing poles were lopped for fodder or cut for other purposes at the height most convenient to the workmen; fires were never checked, and grazing was permitted on areas where natural reproduction took place. The results of all this were more or less ruined

forests. Protective measures which have been gradually introduced during the last 30 years, have had the most beneficial results, both on the reproduction of our forests and the improvement of the growing-stock; but we cannot by such means alone improve the forests to the degree which is desirable. This can only be done by the extraction of all trees damaged beyond recovery; by the removal of inferior species and of old decaying standards which appropriate more space, light and food than they are worth, either as growing-stock or as parent trees In fact, improvement fellings are required over a great majority of our Indian forests, and the sooner they are executed the better it will be. The officers of the Controlling Staff can, on an examination of each forest, lay down the principles on which such fellings should be conducted; but their charges are much too vast to permit of their personally seeing their orders carried into effect, and it is a more difficult task in sylviculture to supervise the correct use of the axe than is that of the spade or hoe in agriculture.

What is required, then, is a specially educated executive staff for sylvicultural more than for any other purposes, though even the latter (such as timber-export, road-making, disposal of material, fire-protection, &c.,) cannot be carried into effect without a staff composed of men of sufficient intelligence and training. The centre of gravity of the most efficient forest organization must for ever lie in an adequate executive staff, sufficiently trained to carry into practical effect the provisions of working-plans, and to execute correctly the general orders or prescriptions issuing from Divisional Officers.

10. It is necessary to take next into consideration not merely the annual recruitment of the above proposed staff, but the initial recruitment. The rules in force prescribe that in future the staff can only be entered through one of the Indian Forest Schools; and whatever may be the difficulties arising in consequence of the large demand for competent men, they must be met by efforts made at the centres of forest education, and only under the most exceptional circumstances should a relaxation of the rules for entry into the Upper Executive Staff be permitted.

Local Governments are empowered to give scholarships to approved candidates while persuing their course of study at the Forest School, and, until the staff is fully formed, there should, I think, be no limitation as regards the number of such grants to be made by Local Government in the case of the Dehra and Poona Schools, so long as the aggregate amount sanctioned for rangerships is not exceeded. For some years to come this amount will not be absorbed, because it will take time to procure the number of efficiently trained Rangers required for the proposed expansion of the service.

I find greater difficulty in dealing with the staff of Foresters and Guards than I have had in formulating proposals as regards Rangers, probably because I have no personal faith in this part of the organization.

There is, in my opinion, no necessity for the strong connecting link, which we do not find in any other forest organization, between the executive and protective staff. It seems to me that, for years to come, the less important ranges must for economy's sake be placed in charge of Foresters in the upper grades, some of whom will, it is to be hoped, when a sufficient number of trained officers become available, be hereafter absorbed into the Rangers' class. I also think that there are some depôts and other special works which are of too great importance to be placed in charge of Guards; and finally it appears advisable to have some exceptional posts to which very deserving Guards might be promoted, obtaining a sort of honorary title with a little higher pay attached thereto. But I do not see the necessity for securing a steady flow of promotion from class to class because the classes are so entirely different as regards the education and attainments required from them. In the former Circular all Foresters were included in the protective staff; but this is a fallacy, as it is proposed to place a considerable number of them in charge of executive appointments.

In the circumstances above explained, I suggest that no distinction be made, in the designation of officers who enter the Ranger class under the same rules and restrictions, and I think that all such officers, on Rs. 50 to Rs 150, should be designated as *Rangers*.

As regards untrained officers, or such as hold a Forest School certificate by the lower standard, who are placed in executive charges, I propose that they should be placed on grades of Rs. 40, 35 and 30, and be designated as *Deputy Rangers* forming the Lower Executive Staff. I would abolish the intermediate grade of Rs. 25, so as to destroy the connection between the executive and protective establishments, and suggest the formation of a class of *Foresters*, or members of an Upper Protective Staff, on Rs. 20, 18 16 and 14, below which would follow the last link of the chain—the *Guards*, or Lower Protective Staff—on such pay and of such grades as local circumstances may require.

It will be observed that I have adopted nearer intervals of pay in the lower classes. As regards Rangers, these intervals vary from Rs. 10 in the lower to Rs. 25 in the upper grades; for Deputy Rangers I have adopted Rs. 5, for Foresters Rs. 2 and for Guards I think the intervals ought to be fixed at Re. 1; but this, as I have already pointed out, must be dependent on local conditions.

Below is a *résumé* of my proposals for the re-organization of the lower executive and the protective staff in the provinces

under the Government of India. The proposals made by Local Governments and Administrations amounted to Rs. 56,692 per mensem; my modification involves an aggregate cost of Rs. 56,477 :—

Résumé.

Province.	Deputy Rangers.		Foresters.		Guards.	
	No.	Cost per mensem.	No.	Cost per mensem.	No.	Cost per mensem.
		Rs.		Rs.		Rs.
Bengal	60	2,100	60	1,020	413	3,716
North-West Provinces & Oudh	30	1,050	24	408	407	3,367
Punjab	24	840	64	1,088	*690	5,280
Central Provinces ...	60	2,100	180	2,060	1,675	12,562
Burma	60	2,100	132	2,376	452	5,720
Assam	24	840	18	302	300	2,462
Coorg	6	210	18	302	91	771
Ajmere	...	...	5	86	42	294
Andamans	5	170	...	...	...	...
Baluchistan	3	105	8	142	55	612
Berar	40	1,390	44	748	157	1,256
Total India ...	312	10,905	553	9,532	4,282	36,040

* and 105 Rákhas.

The total cost of the lower executive staff for India amounts, in accordance with my proposal, to Rs. 1,40,860 per annum; that of the protective establishment to Rs. 5,46,164.

For Madras I propose for the lower executive staff—

Deputy Rangers	60	costing	Rs. 2,100	per month.
Foresters	144	„	„ 2,448	„ „

I propose also 1,004 *Guards* on an average pay of Rs. 8-8 (which, in my opinion, is sufficient), costing Rs 8,534 per mensem.

My re-cast of the proposals costs Rs. 13,082 per mensem.

I propose for the lower executive staff in Bombay.

Deputy Rangers	72	costing	Rs. 2,520	per month.
Foresters	272	„	„ 4,624	„ „

I propose to absorb into this scale the 125 1st grade Guards on Rs. 15 each per mensem asked for by the Committee, which is reasonable in that both Foresters and Guards belong to the protective staff. The number of Guards thus proposed by me is 8,590 at a monthly cost of Rs. 29,680. The cost of these proposals is Rs. 36,824.

The following is an abstract of the proposed re-organization of the forest staff below the rank of Extra-Assistant Conservators :—

	EXECUTIVE STAFF.						PROTECTIVE STAFF.						Grand total of Cost.	Amount for which sanction is required.
	Upper Executive Staff.		Lower Executive Staff.		Total.		Foresters.		Guards.		Total.			
	Rangers.		*Deputy Rangers.*											
	No.	Cost per annum.	No.	Cost per annum.	No.	Cost per annum.	No.	Cost per annum.	No.	Cost per annum.	No.	Cost per annum.		
		Rs.		Rs.		Rs.		Rs.		Rs.		Rs.	Rs.	Rs.
India	291	2,69,220	312	1,30,860	603	4,00,080	553	1,14,384	4,282 & 105 Rakhas	4,32,480	4,940	5,46,864	9,46,944	2.98,716
Madras	109	99,408	60	25,200	169	1,24,608	144	29,376	1,004	1,02,408	1,148	1,31,784	2,56,392	1,06,608
Bombay	102	91,680	72	30,240	174	1,21,920	272	55,488	3,590	3,56,160	3,862	4,11,648	5,33,568	1,18,992
Total of Empire ...	502	4,60,380	444	1,86,300	496	6,46,608	969	1,99,248	8,876	8,91,048	9,950	10,90,296	17,36,904	5,24,316

Sufficient justification for all proposals is, I think, contained in the provincial applications for the necessary increases, which, in my opinion, are, in several instances, framed with too little regard to the future capabilities of the State forest.

It is impossible to promise an immediate expansion of the revenue as a result of the increased establishment, though I believe the gross revenue will still grow considerably; but I may safely say that without an adequate executive and protective establishment, it is impossible to maintain the present revenue and at the same time improve the status of the forests entrusted to Government.

It should be understood that while the present proposals generally provide, so far as the numerical strength of the establishment is concerned, for the normal increase during some years to come, consequent on the development of the forest management of such areas as are already controlled by the Forest Department, they can be regarded as tentative only in others; and in no case does the suggested scale provide for any considerable increase of establishment consequent on extension of the areas placed in charge of the Department.

Such extension is contemplated in Bengal, especially as regards the Chittagong tracts. It is likely to occur in Baluchistan by the assumption of the control of the Zhob Valley forests; and it may take place in the Central Circle of the North-Western Provinces by the absorption of the district forests, which are at present managed by the district officers with an entirely inadequate establishment. As regards Upper Burma, it is as yet quite impossible to form the scale of establishment which may be ultimately required, and it is necessary to be prepared for new demands being made as the result of the development of new resources.

It is a question for consideration whether the amount sanctioned for the subordinate staff should be granted to Local Governments in lump sums, or on account of the preconsidered scales exhibited in the foregoing pages. I am entirely in favour of the latter alternative, at least as regards the upper and lower executive staff; for, in order to secure good and efficient officers, it is necessary to hold out reasonable and sufficient prespects; and this can only be accomplished by a fixed scale of appointments, which should be made known as widely as possible, so that the public itself may judge of the prospects offered.

Though several Governments have submitted proposals for the reorganization of the clerical staff, I have intentionally abstained from taking up this question along with the reorganization of the subordinate forest staff.

IV.—REVIEWS.

Report on the operations of the Department of Land Records and Agriculture, Madras Presidency, for 1890-91.

We lately had occasion to remark, in reviewing a Bombay Agricultural Report, on the pity it was that the Report could not have been reviewed by a professional instead of by a series of amateurs, and a perusal of the Report now before us confirms our opinion. The author, presumably the Director of Agriculture, tells us, speaking of the Saidapet College and Farm, that, "The Director (of the College) is in the future to be 'consulted in all matters regarding the management of the 'Institution" and if we are thus to suppose that hitherto he has not been so consulted, we can only wonder that the College has done the good work it undoubtedly has.

The only part of the Report of interest to Forest Officers, is that on the question of pasturage and fodder. We see it stated that:—"The Government has now emphatically declared that the 'chief object of the Reserved Forests throughout the greater part 'of the country is the provision of pasture, small timber, fuel, and 'leaves for manure or litter, and that they are to be worked 'in order to meet the wants of the villagers in these respects 'and are not to be converted into close reserves for the growth 'of large timber." We can only hope that some Madras Forest Officer will explain to us exactly what this means. We can cordially agree in the advisability of working the forests in an agricultural country chiefly for the supply of local wants; but this seems to us a little too sweeping an order, for we know very well that the average condition of the Madras plains forests is such that without rest, not merely for a year or two, but for long, in order to recover some of the lost 'humus' and allow new seeds to germinate, new grass to grow, and old maltreated trees and bushes to recover, many of the Reserved Forests will not be of much value even for pasture, small timber, fuel and leaves.

In our opinion, the policy of the Government of India of dividing the Forest area into Timber Forests, Pasture Forests and Forests for the supply of local small wood and cut grass, and then working each class in an appropriate manner under a regular plan is more likely to give good results, and result in supplying the wants of the villagers at the same time as it ensures a gradual improvement of the capital stock.

Administration Report on the Railways in India for 1891-92.

In our June number we reviewed Part II of the Report for 1890-91. Part I of that for 1891-92 has now come to hand and so we have now a few additional remarks to make on points of interest to our subscribers. This also has an excellent map shewing all the Indian Railways and brought up to the date of March 31st 1892. It has also an interesting diagram, shewing, plotted as curves, the capital outlay, working expenses, gross earnings, net earnings and number of miles open of Indian Railways from their first commencement in 1853 to date.

On March 31st 1892, the length of Railway line in India was :—

	Miles.
Standard Gauge	10,104
Metre „	7,172
Special Gauges	288
Total ...	17,564

as well as about 38 miles of steam Tramways outside Municipal limits. There are also 1697 miles of sanctioned extensions to be constructed or under construction, the chief work of which is the Assam-Bengal Railway which is to reach the coast at Chittagong after a run of 742¼ miles.

The chapter of most interest to us, as Foresters, is that on Fuel consumption, from which it would appear that 340,038 tons of wood were burnt in 1891 against 326,252 tons in 1890. For most of this the Madras, Southern Mahratta, and North-Western Railways are responsible, the amounts being :—

	tons.
Madras Railway	82,776
Southern Mahratta „	66,233
South Indian „	6,577
Bengal and N.-Western„	1,876
North-Western „	47,186
Burma „	2,642

The rates were various, from Rs. 7-8 per ton on the Mysore Section of the S. Mahratta, to Rs. 2-7-3 per ton on the Bengal and North-Western.

It seems to have been anticipated that the Tondu Reserved Forests of the Western Dooars of Jalpaiguri would supply the whole of the sleepers for the Bengal Dooars railway, but enquiries prove that only 18,000 will be so available, so the rest are being obtained from other Bengal Forest Divisions and from Burma. The only other mention of wooden sleepers is that one lakh of deodar and half a lakh of creosoted pine are being put down on the Bhávnagar-Gondal railway.

Forestry in South Australia.

The report of the administration of the State forests in South Australia for the year ending 30th June, 1891, shews a total area of 227,135 acres, or about 355 square miles, about the equivalent of a single forest division in India. Mr. Walter Gill, who writes the report, was appointed Conservator on the 24th July, 1890, so this is his first report, after one year's experience as to the working of the forests. Out of the total area of forests under his control, it seems that 10,000 acres are enclosed for planting and "encouraging the natural growth of trees in the 'indigenous forests."

Of the former, as in all Australian Reports, we hear a good deal; of the latter, very little. In the planting operations, 439,058 plants were put out, chiefly sugar and other gums, three European pines, poplar, willow and larch. But more than half died within the year, much of the damage being due to grasshoppers. The planting of the gums appears to be effected in bamboo tubes.

The natural reproduction is due to forest fires, which swept through the country for miles, resulting, however, in a crop of young seedlings under the parent trees, especially of various kinds of eucalyptus. Unfortunately as Mr. Gill points out, "the good 'thus effected in the first instance is too often subsequently nulli-'fied by a repetition of the fire when it is not required."

The timber operations embraced the delivery of 13,000 broad-guage sleepers and 40,000 posts to the railway authorities, besides a lot of 10,000 smaller—metre guage, apparently—supplied from various depôts. We would like to ask what security there is for keeping up the stock in the Wirrabara forest when so much timber is removed? We read that timber was carted from this forest thirty years ago, and has been obtained from there ever since, and "the wonder is, not that the available supply should at length have reached its limit, but that it should have lasted such a length of time." How has this timber been replaced? What is the condition of the young crop, or is there none?

Then again, what does the leasing of certain reserves imply? What rights does the lessee purchase; what conditions is he bound by? These and many other questions occur to us naturally, for without an explanation, the report is incomprehensible on these particular points. Attempts were made to plant out vine cuttings, olives and certain pines near a fresh-water lagoon in the Hundred of Ramsay, but a salt deposit, something like our friend the *Reh*, subsequently made its appearance, and the nursery had to be abandoned. There seems to be a large area of scrub land liable to this saline efflorescence; scores of farmers have taken up selections on these lands and have retired in disgust after a year's or two year's experience. All the best land is in private hands.

A large number of plants are distributed every year to applicants for putting out, with more or less success, the results on the whole not being satisfactory. However, more attention is being paid to this subject and we many hope for better reports in future. Arbor Day is a feature in the colony, "the children 'entering most zealously into the enjoyable outing;" we must trust that the 25,723 trees were properly planted on this occasion. Mr. Gill has nearly one million plants in his nurseries, so there is no fear of artificial reproduction not being kept up.

The total revenue of the South Australian Forests is £4,043 and the expenditure £8,017, nearly two thirds of the revenue comes from rents from lands leased and let (about which we should like to hear more) and half the expenditure is due to wages, nurserymen, foremen, laborers, &c. Besides the expenditure, as given above, however, there were special votes amounting to £2,375, chiefly incurred on planting.

An interesting feature in the report is the account of the cultivation of the date palm, the ultimate success of which appears to be probable. An endeavour is being made to obtain suckers from Karachi, through the agency of the Afghan colony at Hergott, the place where the cultivation of this palm is being tried. Mr. Gill, on comparing the conditions under which the palm is grown by the French in the Sahara, and those obtaining at Hergott, has every hope of success; of the importance of the experiment in a hot and arid country like South Australia, there can be no doubt.

A. S.

V—SHIKAR.

A trip to Bara Bangahal.

23rd May.—Left Yarra at dawn for Surai, the path lies along the face of very precipitous and dangerous ground and the journey is a decidedly sensational one. The famous "Kali-dhog," (Black-rock) is crossed soon after passing the liquor distillery below Yarra. Steps have been cut across an enormous black rock below which is a sheer drop of probably two or three hundred feet. The steps are slippery and nasty going. They are said to have been made at the request and expense of one of the Ranies of Nadaun (Kangra District) an inhabitant of these parts, some time prior to the Mutiny of 1857. Reached Surai about 1 o'clock p. m. just as a heavy shower came down. The scenery all round is very wild and grand. The Ravi runs in a deep and narrow valley below and is a roaring, foaming

torrent here. The forests of Blue Pine, Webbiana and Smithiana, are lovely, for they have never been subject to the ill usage suffered by forests situated within the reach of traders and villagers. The winter here is very severe and the inhabitants of this little village lock up their dwellings and clear out of the valley in October and November and do not return again till the end of May or June. Only two men had arrived in the village, and from these we tried to obtain grain for the coolies; after a bit of a search, a small quantity was produced. One of the houses had been broken into by bears and the huge grain basket turned over and the contents devoured.

24th May.—Queen's Birthday. God bless Her. Started early and saw marks of bears all along the path and in the "gotes." There is excellent bear shooting all round here, but I was anxious to get to Bara Bangahal, and could not stop to prospect. Path very bad going, over dangerous ground. At Oorna, saw a brown bear and cub but could not get near enough for a shot. After passing Oorna, the path lay along a nasty landslip, then down the face of a cliff, and finally the Ravi is crossed by a very rickety twig bridge. The enormous bare cliffs above the bridge are almost perpendicular, and are strikingly impressive. Got to Giraunda, a small village, very tired and fatigued, owing to the constant tension on one's nerves, for you cannot help realising what the result of a false step would be on such ground. There is splendid "Chôkôr" shooting all round the village.

25th May.—Halted at Giraunda, as the weather looked very threatening, and the villagers advised us strongly not to attempt the journey beyond, in wet weather, as there were many dangerous landslips to cross, and rocks were constantly rolling down from the cliffs above. There is very good bear ground all round here, if one only had the time to go round it.

26th May—Started late, not feeling particularly well. This is certainly the most dangerous portion of the whole journey from Palampur to Bara Bangahal. The landslips to be crossed, with the constant falling of huge stones from the cliffs above—the bare rocks to be scaled down, with nothing but the cracks and crevices in them to hold on by and then the final climb up a sheer precipice, with positively no more than mere ledges as broad as the palms of one's hand to rest your feet on, makes this march a very trying and fatiguing one. It was here that Colonel Tanner of the Survey lost his fox terrier, which fell over a precipice. I had to get my dogs carried in blankets for no four footed animal could possibly climb up these cliffs. Passed the village of Khanār about 1 o'clock; there was not a living soul in it, none of the villagers had returned since their exodus in October last. The empty houses were in possession of heaps of "Chôkôr" which were as tame as barndoor fowls. Reached the Khála-páni, gote about 4 or 5 p. m. and though it is a bad camping ground,

I was glad to finish the day's journey and turn into bed for I was dead beat. The wild rhubarb and onion grow profusely all round here and as I had had no vegetables for some days, I was glad to accept the Khansama's proposal to have some of the rhubarb cooked for dinner. The best way to cook it is as follows :—

Peel the flower stalk, boil it to a soft pulp, strain off the water carefully, then cook up the pulp with a little ghee and salt or butter if you have such a luxury in camp.

The young fronds of the large sized fern whilst they are in their curled up state, are not at all bad eating, cooked up like spinach. The wild onions are too strong.

27th May.—Up very early—feeling very fit—probably from the rhubarb eaten last night. Road still very bad ; the dogs had to be carried in blankets. Reached the village of Bara Bangahal about 3 p. m. and was delighted to see broader valleys and easier hill-sides.—Here are situated the head waters of the Roir, a roaring and foaming torrent. Bara Bangahal has an area of about 290 square miles, but contains only one village, situated at the lowest point of the valley, some 8,500 feet above the sea. Some 12 or 13 years ago a number of the houses were swept away by an avalanche. On all sides, the mountains slope steeply up from the river, and rise into peaks of from 17,000 to 20,000 feet in height. Deodar and Blue Pine are in compact patches in the lower ravines ; above these are long bare slopes of splendid grazing lands, to which the flocks of sheep and goats from Mundi, Palampur and lower Bangahal resort during the three summer months. Above the grazing grounds come glaciers, bare rock and cliffs, and fields of perpetual snow. The rough sketch appended shows the position of the valleys, streams and forest lands and the places where the brown bear and ibex may be found. It is a very wild and dangerous country to travel over, but the climate is glorious and the feeling that you are in a thoroughly wild and uninhabited region is very exciting and pleasant. Mine is an article on " Shikar " and so, I will not here describe the forests.

28th May.—Up early and visited the Deodar Forest opposite my camp. After breakfast moved camp to a very jolly flat up the Kali Hein Nala. Most lovely looking bear ground ; for miles nothing but beautiful grassy hill sides and " gotes " the favorite feeding grounds of brown bears. High up the ridge above us, I spotted a splendid large brown bear but he was on the move making for the Roygar nala valley ; directly after, I saw another a long way off in the deep snow, but as the rain came down in torrents, had the tents pitched and turned in.

29th May.—Left the Challa-gote very early and reached the Kúmhêd gote about 2 o'clock ; the path runs along lovely grassy hill sides, which unfortunately swarm with ticks. These little pests drive one nearly mad, for their bite is very venomous, and

stings like a hot coal on the skin. The people say that in some places where they swarm, sheep are occasionally killed from the bites of the numbers that attack them. Got an attack of fever and ague and had to turn in.

30th May.—Started early up the valley to look for Ibex. Ground awfully bad. Just as I was sitting down to tackle my breakfast, I spotted three Ibex; left the breakfast and cooly behind a rock and stalked the fine looking beasts on the cliffs above us, got within 120 yards of the largest head in the herd and knocked him over, but before we could get up, he had picked himself together and cleared off over some very dangerous ground where we could not follow: however the shikary said he knew a way of getting round the obstacle and off we started again; we had not gone very far, when the shikary spotted a young male standing sentry on the top of a high rock, he was certainly not worth shooting but as the shikary begged hard that I should try and bag him to supply the camp with meat, I got an easy shot at him and bowled him over. With our load we started down the hill to camp, as I was only too willing of an excuse to get in and have a cup of tea and something to eat, for I had lost the breakfast cooly. Received a post in the evening and remained in camp to answer it.

31st May.—Started after breakfast with Barêrū Shikary to hunt up the wounded Ibex. He had climbed up into very dangerous ground, where I felt I could not follow, so gave the rifle to the shikary to finish him off. After a bit of searching, he spotted the wounded beast lying in a deep ravine, where he could not be got at and so drove him out with stones. He came down towards where I was standing and gave me an easy shot which finished him off. How on earth he had ever got over such ground after the wound he had had the day before, was a wonder to me, for he had a huge hole high up in his hind quarters into which I could put my hand. I was very glad of my trophy, though it is by no means a fine head. Got back early to camp, and prepared to move lower down the valley again. The Shikary and I started ahead of the camp to look for bears. Soon we spotted a she bear and two cubs low down in the nala. I bagged the she bear with the first shot, and then watched the extraordinary behaviour of the two cubs, these jumped and danced on their hind legs round their dead mother, then not finding her rise, they smacked her over the head, bellowing all the while, and then finally bolted down the hill: they were too small to shoot, so I amused myself calling to them and more than once got them to come up within thirty yards of me while I lay hidden behind a dead tree. Got into camp late, very pleased with myself and every one else.

(To be continued.)

F. O. L.

Forest School Sports at Dehra.

The annual sports of the Imperial Forest School were held on the old parade-ground at Dehra on Saturday afternoon, October 22nd, under the supervision of Mr. Gamble, the Director of the Forest School; Mr. Smythies, the Deputy Director; and Messrs. Gradon and Gilbert Rogers, the instructors at the School. The students this year number 104, of whom 32 are Europeans, and 72 natives of India, a marked increase over the numbers last year, which were 26 and 50, respectively. A beautifully clear, cool autumn day brought the whole of Dehra to the parade-ground, to witness the various competitions, which were very well carried out, and keenly contested, the greatest interest being shown by the native assemblage—Gurkha, Sikh, Pathan, and Hillman alike. The best contested events were the 100 yards' hurdle race, and half mile, especially the last, which was run in excellent style, the winner having lots of go in him at the finish. The long jump would have been a certainty for F. J. Langhorne had he not each time overstepped the line. The various events and winners were as follows :—

1.—*Flat Race.* Distance 100 yards.

R. H. Cole	... 1
F. J. Langhorne	... 2

Time—$11\frac{3}{5}$ secs. A very close race. Only 6 inches between first and second.

2.—*Long Jump.* One prize, open to whole School, and one prize for native students.

W. J. Lane-Ryan	... 1
Ethirajulu Naidu	... 2

The winner jumped 16 feet 2 inches; the second 15 feet 8 inches.

3.—*Hurdle Race.* Distance 120 yards, over 10 flights of hurdles.

F. J. Langhorne	... 1
J. F. Tweedie	... 2
W. J. Lane-Ryan	... 3

Won by a yard. Tweedie's jumping was much admired.

4.—*Throwing the Cricket Ball.*

W. J. Lane-Ryan	... 1
J. H. Firth	... 2

The winner's throw was 96 yards 8 inches.

5.—*Flat Race.* For native students only. Distance 220 yards.

Ethirajulu Naidu	... 1
Ratan Chand	... 2

Won by a yard, after a very good race. The winner a splendid specimen of a Peninsular race.

6.—*Putting the Shot.* 16lb.

W. J. Lane-Ryan	... 1
R. G. Hannah	... 2

The winner putted 34 feet 1½ inches.

7.—*High Jump.* One prize open to whole School, and one prize for native students.

W. J. Lane-Ryan	... 1
Ethirajulu Naidu	... 2

The height jumped was 5 feet 1½ inches; the second 4 feet 10 inches.

8.—*Half-mile Race.* Open to whole School.

T. C. Legge	... 1
S. A. Wood	... 2

Won by 3 yards; a splendid race; won easily. Time 2 mins. 24 secs.

9.—*Flat Race.* For School servants. Distance 100 yards.

Krishna	... 1
Sati Din	... 2
Fateh Singh	... 3

10.—*Flat Race.* For men of the 2nd P. W. O. Gurkhas. Distance 100 yards.

Tikram Kunwar	... 1
Nathu Damar	... 2

The invincible champion of the 2nd Gurkhas easily secured another victory. Time—$11\frac{1}{5}$ secs.

11.—*Tug-of-War.* Seniors *vs.* Juniors, 12 on each side; 3 tries.

The juniors won the first try, but exhausted themselves, and lost the second and third tries amidst great excitement.

At the conclusion of the races the prizes were presented to the winners by Mrs. Smythies, for whom three hearty cheers were given, followed by cheers for Mr. Gamble, and the School staff. —*Pioneer.*

VI.—EXTRACTS, NOTES AND QUERIES.

On Judicious Pruning.

By William M'Corquodale, Forester and Wood Surveyor, Scone, Perth.

It is to be regretted that there are so many conflicting opinions on this subject. Some authors strongly advocate the advantages of skilful pruning, while others positively deny that any advantage accrues from even the most judicious pruning.

In the English Crown Forests, pruning was abandoned some thirty years ago. Following that example, the same course has been adopted on many private properties in both England and Scotland.

Some theorists declare that there is such a connection subsisting between the roots and branches that when a live branch is removed all the corresponding roots supporting that branch immediately cease to perform their functions and die.

I well remember, nearly forty years ago, having an interesting conversation with an able arboriculturist on the subject of pruning, when he substantially denied that the art of pruning in any shape or form would do good. He maintained that when a live branch was taken off a tree, the roots in the ground supporting that branch would die. After a considerable amount of discussion, I asked him to answer one question in support of his theory, and I would be satisfied. That question was—"Why is it 'that, when a healthy oak tree is cut down, the roots do not die; 'but, on the contrary, continue in vigorous action, and the stool 'immediately produces a healthy crop of shoot?" To this question he gave no reply.

Soon after this, I resolved to try experiments to enlighten myself on this subject by sowing a few seeds of *Abies Douglasii* in a convenient corner in my garden, to see if I could make any satisfactory discovery relative to the subject of our discussion. From these seeds I reared one plant for four years till it was about 3 feet in height. During that period I never allowed even a bud to form on the stem of this plant. So as soon one appeared, it was at once rubbed off. The plant, notwithstanding, grew with a beautiful clean, straight stem; but unfortunately, in the fourth year of its growth, in autumn, when the hedger was engaged cutting the garden hedge, he accidentally broke it over near the surface of the ground. However, it had answered my purpose very well. I grubbed up the root carefully at once for inspection, and, to my agreeable surprise, found it unusually large for a plant of its size, seeing that it was never permitted to produce the semblance of a branch. The root was divided into three large

forks, and these were matted with healthy fibrous rootlets at their extremities. From my friend's point of view, I expected that this plant, which was reared branchless, would have no other root but the tap-root; but I found no difference in the ramification of its roots from that of young plants of the same age having the whole of their natural branches.

I shall add another illustration as to the connection subsisting between the roots, branches, and stools of trees, which, together with the foregoing remarks, will, I trust, go far in confuting the opinion entertained by certain theorists that the removal of a live branch will prove fatal to the corresponding roots supporting it.

I have repeatedly fallen in with pine-root stools which continued their vitality for many years after the tree was cut down, with the face of the stool healing over from the outside as regularly round the whole stool and in the same way as a wound on the trunk of a tree after a branch has been pruned off. In all such cases it was found that the stools had—prior to the trees being cut down—roots united with, or naturally engrafted into, roots of an adjoining tree of the same kind, which roots continued to draw sufficient nourishment from the standing tree for the support of the stool for years after their own tree was cut away.

About ten years ago I found a larch stool in Scone Wood about ninety years of age, the stem of which had been cut off some ten years previously. This stool was a solitary one, too far apart from any larch or other fir tree to nourish it. Yet this stool was in life; growing and healing all round. I got men with tools and laid its roots bare. They were all far gone with decay, save one, which was quite fresh. I traced it to its nurse, and found it to be lying across, deeply embedded, and strongly engrafted into, a healthy root of an adjoining ash tree. How is it that this engrafted root, without the aid of a green leaf, nourished the whole stool, giving circulation to the sap all round, and producing sap-wood and bark? This is a question for botanists and theorists to solve.

Judicious pruning is a very important branch of forestry. I do not hold that even judicious pruning will, as a whole, augment the bulk of timber in a tree; but, from my experience of fifty years, watching the beneficial result of its effect upon trees under my management, I certainly hold that early periodical pruning, when skilfully pursued, will have the effect of producing ultimately a much larger yield of clean, straight, valuable timber per acre than would have been the case had the trees remained in a natural condition. No doubt there are individual trees that on certain soils grow naturally tall and straight in the bole, and therefore require but slight artificial training; but, generally speaking, with few exceptions all oak trees require skilful training, and when trees are properly treated in this manner a larger number can be reared per acre, and are not so likely to be blown over by high gales, or to have their limbs torn off.

I should fancy that the opponents of pruning never themselves had the advantage of seeing the beneficial results of systematic pruning. The benefit accruing from such training is not be obtained in a few years. An arboriculturist treating a young plantation in this way, and following up its training, may be forty or fifty years before seeing the actual result of his operations. Of oaks that were pruned at Scone under my direction forty-five years ago, hundreds are at present being cut up at the saw-mill for the building of railway waggons, and to me it is most satisfactory to find the timber so sound, free from blemishes, and beautiful.

I have seen pruning so barbarously performed and the trees mutilated in such a manner that it must have proved disastrous in the highest degree, ruining the constitution of the trees, retarding their growth, and ultimately yielding faulty timber. Such pruning should not upon any account be tolerated; and when the timber comes into the hands of tradesmen it is no wonder that pruning is condemned. But the effects of judicious pruning are of an opposite character.

Young oak trees from the nursery to be planted in the forest should receive no further pruning than the shortening of contending shoots or strong side branches. When they arrive at six or seven feet in height they should receive a regular course of training by pruning, which can be performed almost wholly by the use of the pruning knife. The operator should always begin at the top of the tree, shortening shoots which rival the leader more than half their length. Strong rambling side branches should also be shortened fully one-half; and when a tree is overcrowded with branches low down, some of these ought to be thinned out and pruned close to the stem. Young trees at this stage of growth should be so well balanced and shaped that little or no pruning will be required for several years after.

In the next course of pruning, the operator ought to be provided with ladder, pruning-saw, pruning-knife, and shears on long handles. Before ascending the tree, he should examine it minutely, and see what will be required to balance and shape the tree properly. After ascending, he should begin at the top, shortening the rival leader, if there be one; but as there is often a difficulty in reaching a rival top, the pruning-shears are brought into requisition to shorten it.

The operator, in descending the tree, should shorten extra strong branches at least half-way in. These would always be cut at a lateral small branch, or twig, of an upright growth. Strong branches growing pretty low on the bole should be shortened well in near the bole, in order to throw vigour up the stem of the tree. At this course of pruning, a few branches ought to be pruned away at the bottom, close to the stem. Other successive courses of pruning should be conducted on the same system, with this addition, that more branches will be required to be pruned close to the bole.

The point to be studied for the safe guidance of the operator is—what is the largest size of a branch that can be pruned from the bole without leaving any blemish in the timber? The health and vigour of the tree is the safest guide for this. I have seen the boles of trees thirty-five to forty years of age after being pruned healing at the rate of half-an-inch a year from each side of the wound, whereas trees in a less vigorous condition did not heal over one-fourth of an inch in a year. Therefore the health and vigour of the tree should be the guide, so as not to prune a branch from the bole of a tree if the timber at the wound will in any way deteriorate before it heals over. Rotten branches on the boles of trees should be pruned off before they are affected with rot at the base, in order that the wounds shall heal before decay takes place.

Great care should always be taken against over-pruning, as thereby trees are retarded in their development, and rendered very unsightly. Trees at the final course of pruning ought to be left with their heads varying from one-half to one third of the tree. Oak coppice has become so worthless that pruning it need not be discussed.

The History of a Railway Sleeper.

Travellers on the North-Western Railway during the past year must have noticed with surprise the vast number of sleepers collected at Delhi and Umballa for the Delhi-Kalka Railway, and have wondered from whence such quantities of light coloured timber have come. Sleepers, as is generally known, are laid crosswise on the ballast of the railway line, and on them the rails are fastened; they are placed approximately three feet apart, so about 1,760 sleepers are required each running mile of line. The white wood of which sleepers are composed is not found in the plains, but comes from the hills many hundred miles away. In the vast forests of Garhwal, Sirmoor, and Jaunsar, the hill sides are thickly clad with deodar (*Cedrus deodara*) and chir (*Pinus longifolia*) from which sleepers are chiefly made; these regions are a country in which there is not 100 yards of level ground; where in places, thousands of young trees can be seen coming up as thick as corn in a field; and supply most of the timber used on railways, in roofs, doors, &c. Felling the trees, and sawing the logs, is done by professional sawyers during the dry season of the year from October to June; during the rains the forests are nearly impenetrable and little work is done. After being sawn, the sleepers are sent down the hill sides, which are cleared to allow of their easy descent! or down shoots specially prepared for the purpose; or down timber *runs*, which are planted slopes on which the sleepers side, each succeeding one pushing that in front till it reaches the river side, at the bottom. These hill sides are of wonderful beauty

and wildness, but from their inaccessibility they are seldom visited except by the forest officers in whose charge they are. After reaching the river sides, chiefly those of the Jumna, the Tonse, and the Giri, they are thrown into the water and are carried on till they reach the valley of the Dun where the rivers debouch from the hills ; at Dhakpathar they are stopped by a boom placed across the river, and collected by their various owners. Before the sleepers are thrown into the rivers they are marked on the broad side close to the ends. Each owner has his mark registered in the Forest Office on payment of a fee, so on reaching Dhakpathar the sleepers are all claimed; sleepers that have no mark become the property of Government, but broad arrows are used to mark those cut in Government forests ; three arrows denoting first first class timber, two arrows and one denoting inferior qualities.

The boom is placed diagonally across the Jumna where the bed is rocky and deep on the western Sirmoor bank, and shallow on the eastern or Dun bank: it consist of two beams of deodar, 15 inches deep, 6 feet apart,in lengths of 10 feet, held together by sleepers placed crosswise and dove-tailed into the top, the whole being kept together by wire rope passing through rings fastened on the top and round the beams at the joints; the wire ropes are strongly attached to the rock on the west side, while to keep the boom in position, wire rope guys are fastened from the east side. Below the boom are timber logs, also kept in position by wire ropes, the object of the logs being to allow the passage of rafts over them. The sleepers coming down the main stream on the western side are diverted on to the eastern side by the boom collected by the owners in the shallow waters on the east, and stacked on the river side.

The boom is put up annually about the 15th November, and taken to pieces about the 15th June when the Jumna floods begin. It has only been in existence about 5 years ; previous to which, sleepers were collected by the Maharajah of Sirmoor, and by a contractor who made a large fortune in a few years. As portions of the rivers Tonse and Jumna pass on one side through Sirmoor territory, a fair proportion of the dues collected by the Forest Department is paid to the Maharaja. The Forest Agency look after the sleepers for 10 miles above Dhakpathar, returning to the water any that get stranded on the river sides: they put up and maintain the boom ; and rescue any sleepers that get past the boom owing to floods or accidents ; for doing this, carriage dues are charged on each sleeper for the river passage ; collecting dues for the boom ; and salvage dues for any sleepers rescued. The dues are very small, but, as the number of sleepers and karis sent down exceeds thirty lakhs annually, of which about three lakhs come from Government forests, the total the of proceeds amounts to a very considerable sum. A good deal of difficulty is experienced in maintaining the boom ; small floods and freshets come down the river after each fall of rain ; and in

April, when the snows begin to melt, sleepers constantly get under the boom; at night also in cold frosty weather it is hard to keep the establishment up to their work. It is greatly to the credit of the Department that only about 1,500 out of 30 lakhs of pieces get past the boom, a proportion of about 1 in 2000.

Some of the sleepers come from near the source of the Jumna, 110 miles above Kalsi, where it enters the Dun. The river flows over a succession of rapids, with a fall of about 20 feet per mile, through some of the most beautiful scenery in the world. The tall peak of Jumnotri, the source of the Jumna, can be clearly seen clad in everlasting snow, on a fine day, from the plains at Saharanpur; Gangotri, the source of the Ganges, being also seen on the eastern side, some 60 miles away. At Kalsi, where the Saharanpur-Chakrata road is carried over the Jumna by a fine suspension bridge, on the right bank is to be seen the Chhatr-Sila, or canopy stone, a monolith which is inscribed with the edicts of Asoka; it is supposed to be an ancient boundary mark between China and Hindustan. The stone is a quartz boulder, 10 feet long, and of the same height, inscribed with letters on two sides, and figures of elephants, &c., on the others. The name is probably due to its having been once covered with a canopy, as there are a number of squared stones close to the rock which probably formed the pillars.

A short distance above the junction with the Jumna, the Tonse has a beautiful spot known as "the dripping wells;" clear limpid spring waters filter through the rocks and fall in showers on the river banks, the surface of the rocks being covered with enormous fronds of maiden hair, (*Adiantum capillus-veneris*, (Linn), that most graceful of ferns.

When sufficient sleepers are collected at Dhakpathar a raft is made. About 120 broad-gauge, or 160 narrow-gauge sleepers are put into each raft, two layers of sleepers, laid flat and crosswise, forming the main portion, others laid longitudinally keeping them together. They are all tied with coarse grass rope, and a few sleepers are placed on the top to form a sort of hurricane deck, on which the men stand. The rafts are about 50 feet long, and guided by two men with long sal barge poles, who keep them in mid-stream and shove them off the sides when going down rapids and round curves in the river. After being put together the number of sleepers in the raft is counted by the forester, and a pass is supplied on which the number is entered; they are checked at various places till the raft passes into the western Jumna canal at Bogriwalla, or down the river below the canal head.

A voyage down the river on a raft is as interesting and exciting an event as one down a Canadian river in a bark canoe manned by *voyageurs*; and calls to mind the ludicrous adventures of Mark Twain's "Tramp Abroad" on the German timber raft on the Rhine. In the river broads all is quiet and plain

sailing; but where there are rapids, and in the narrow artificial channels made an places where the river is almost impassable, the passage is adventurous, and all the skill of the raftsmen is required to prevent the raft being dashed against the sides and broken up; the numerous broken and stranded rafts testify to the fact that the passage is none of the easiest, and the greatest care is necessary. One particular spot, about three miles above Rampur Mandi is the Scylla and Charybdis of the raftsman. The Jumna here passes through a gorge where the depth of water is great, and the sides and bed rocky; a black conglomerate rock can be seen jutting into the main stream of the river, with a strong whirpool above it; many rafts go to pieces at this point and the sleepers are sucked under water; the men believe that they never appear again but they probably are carried down a passage in the rock under water, and come to the surface again lower down stream. There is no doubt that the passage at this point is dangerous, and the place a fearful one.

Good sport is to be had from a raft going down the river; duck and teal abound on the river bank; and, accustomed to the sight of the rafts constantly passing, allow them to approach very close before rising; a very fair bag can be made in this way. A spotted or hog deer can often be shot in the early morning when taking his morning drink before retiring for the day to the sal forests of the Siwaliks; while leopards, and occasionally tigers, are to be seen at the water's edge. If only one of the uninteresting looking sleepers on a railway could speak, what splendid accounts could it not give of lovely scenery and wild animals it had seen on its passage from the hills to the plains of India.—(*Z, in the Pioneer*).

VII—TIMBER AND PRODUCE TRADE.

Churchill and Sim's Circular.

October, 5th 1892.

EAST INDIA TEAK.—We have again to report a wretched delivery of 661 loads for the month, against 1,551 loads in September, 1891 and 2,040, loads in September, 1890, making only 7,656 loads for the nine months of this year, against 11,392 loads in 1891 and 12,926 loads in 1890. Some business is reported at fair rates in floating cargoes, a few being now due in Europe and some of them unsold. In the meantime the London Dock Stock is reduced to very moderate dimensions and prices here are stationary.

ROSEWOOD.—EAST INDIA.—There is no improvement in the demand, and therefore, although stocks are not heavy, they are sufficient.

SATINWOOD.—*Logs*, if plain or of small sizes, are neglected, but for large and figury logs fair prices are obtainable; *planks* and *boards* are not in demand.

EBONY.—There is no improvement in the demand and stocks remain heavy.

Price Current.

Indian Teak	per load	£9 10	to	£15
Cedar, Malabar,	per sup. ft.	3d	to	3¾d
Satinwood	per ton	£6	to	£10
Rosewood	per ton	£7	to	£10
Ebony	per ton (nominal)	£6	to	£9

MARKET RATES FOR PRODUCTS.

(Tropical Agriculturist, October, 1892.)

Cutch	per cwt.	24s.	to	34s.
Croton seeds	„	15s.	to	20s.
Gum Arabic, Madras	„	40s.	to	80s.
Gum Kino	„	80s.	to	90s.
India Rubber, Assam	per lb.	1s. 6d.	to	2s. 1d.
„ Rangoon	„	1s. 6d.	to	1s. 9d.
Myrabolams, Bombay	per cwt.	9s.	to	10s. 6d.
„ Jubbulpore	„	8s. 3d.	to	9s. 6d.
„ Godavary	„	8s.	to	9s.
Nux Vomica, good	„	8s.	to	9s. 6d.
Orchella, Ceylon	„	20s.	to	25s.
Redwood,	per ton	£3.	to	£3-10s.
Sandal wood, logs	„	£35	to	£60
„ chips	„	£9	to	£30
Sapanwood	„	£4	to	£7
Tamarinds	per cwt	8s.	to	9s.

Some of our readers may be interested to learn in the Introduction to the Annual Accounts of the Seaborne trade and Navigation of Bengal, 1891-92, it is stated that the exports of Myrabolams to the United Kingdom in that year almost doubled and that the average price was higher, being Rs. 4-4 per cwt against Rs. 3-6 in the previous year. The improvement may be set down to the smaller importations of Valonia. We hear that the falling off is caused by an insect which has recently committed great havoc among Valonia acorns.

VIII.—EXTRACTS FROM OFFICIAL GAZETTES.

1.—Gazette of India.

21*st October*, 1892.—No. 1307-F.—With reference to the Notification of this Department, No. 293-F., dated 27th February 1891, an extension of furlough for two months has been granted by Her Majesty's Secretary of State to Mr. H. C. Hill, Conservator of Forests, 1st Grade.

2.—Madras Gazette.

2*7th September*, 1892.—Forester First-grade C. Dhan Sing to act as Ranger, Fifth Grade, sub. *pro tem.*, with effect from 1st September 1892.

29*th September* 1892.—Leave to Ranger M. Shumsudden Sahib for two months, from 8th September 1892, under article 369 of the Civil Service Regulations.

29*th September* 1892.—Mr. G. W. Thompson, Ranger, Fifth Grade, to act in the Fourth Grade during Ranger Shumsudden's absence on leave.

3*rd October* 1892,—No. 468.—In the schedule appended to the notification under section 63 (*a*) of Act V of 1882, published at pages 588 and 617 of Part I of the *Fort St. George Gazette*, dated 23rd September and 7th October 1884, respectively, the term "Extra-Assistant" should be inserted before the words "or Sub-Assistant Conservator."

4*th October* 1892.—In supersession of the sick leave granted to Ranger Mr. Bower and notified at page 1224, Part II of the *Fort St. George Gazette*, dated 6th September 1892, that officer is granted privilege leave, under article 291 of the the Civil Service Regulations, for twenty-two days from 25th August 1892.

6*th October* 1892.—Ranger M. L. Naraina Sastri from South Arcot to the Cuddapah District, to join at once.

Ranger M. Kothandarama Mudaliar from the Cuddapah to the Salem District.

Ranger C. N. Lakshman Row from the Salem to the South Arcot District.

11*th October* 1892.—No. No. 477.—Mr. R. McIntosh, Acting District Forest Officer, Cuddapah, is granted examination leave for two months.

18*th October* 1892.—No. 492.—Mr. E. D. M. Hooper, Acting Conservator of Forests, Northern Circle, is granted furlough for one year and six months, under article 340 (*a*) of the Civil Service Regulations.

18*th October*, 1892.—To Ranger M. Kothandarama Mudaliar privilege leave for one month from date of relief, under article 291 of the Civil Service Regulations.

16*th October* 1892.—To Ranger C. N. Lakshman Row privilege leave for two months from date of relief under article 269 of the Civil Service Regulations.

3.—BOMBAY GAZETTE.

7th October, 1892.—No. 7956.—His Excellency the Governor in Council is pleased to appoint Mr. G. K. Betham to act as Divisional Forest Officer, South Kanara.

12*th October*, 1892.—No. 8102.—Mr. A. C. Robinson, South Sub-Division Forest Officer, North Thana, passed an examination in Marathi on the 7th October, 1892.

14th October 1892.—No. 8155.—In exercise of the power conferred by Section 70 of the Indian Forest Act, No. VII of 1878, the Governor in Council is pleased to direct that, in lieu of the fines fixed by Section 12 of the Cattle-trespass Act 1871 there shall be levied in the Nagar Taluka of the Ahmednagar District, on and after the 15th August 1892, in respect of cattle trespassing in the closed portions of the Reserved Forest Kurans mentioned in the margin,* and impounded under Section 69 of the Indian Forest Act, fines at the following rates, viz.:—

* Name of Kuran.	Name of village near which situated.
1. Sussawadi ...	1. Sussawadi. 2. Kolhar. 3. Pimpalgaon Ujani.
2. Kapurwadi ...	1. Kapurwadi. 2. Deogaon.
3. Shendi ...	1. Shendi. 2. Dangarwadi.
4. Manjarsumba ...	1. Pimpalgaon Malwi. 2. Manjarsumba. 3. Dehera.
5. Ghospuri ...	1. Gutawaree. 2. Ghospuri.

For each buffalo ... ... One Rupee
For each horse, mare, gelding, pony, colt, filly, bull, bullock, cow or heifer ... . Eight annas.
For each calf, ass, pig, ram, ewe, sheep, lamb, goat or kid ... ... Four annas.

No. 8155*A*.—His Excellency the Governor in Council is pleased, under Section 2 of the Indian Forest Act, No. VII of 1878, as amended by Act No. V of 1890, to appoint the officer for the time being holding the post of Executive Commissariat Officer, Ahmednagar, to be a Forest Officer, and, under Section 75 of the same Act, is pleased to appoint the said officer to do all acts and exercise all powers that are prescribed by the Act or by rules made under it to be done by a Forest Officer or by any Forest Officer: such powers to be exercised in respect of the Reserved Forest Kurans in the Nagar Taluka of the Ahmednagar District specified on the margin*, which have been assigned for the use of the Commissariat Department.

* Name of Kuran.	Name of village near which situated.
1. Sussawadi ...	1. Sussawadi 2. Kolhar. 3. Pimpalgaon Ujani.
2. Kapurwadi ...	1. Kapurwadi. 2. Deogaon.
3. Shendi ...	1. Shendi. 2. Dangarwadi
4. Manjarsumba ...	1. Pimpalgaon Malwi. 2. Manjarsumba. 3. Dehera.
5. Ghospuri ..	1. Gutawari. 2. Ghospuri.

4.—BENGAL GAZETTE.

1*st October*, 1892.—No. 3558.—In the list of revenue stations of the Sundarban Forest Division published in the notification, dated the 5th November, 1888, *for* "14, Cobaduk, left bank of Cobaduk river above its junction with Golputtoo river," *read* "14, Cobaduk, junction of the Golputtoo and Arpangassia rivers."

5.—N. W. P. & OUDH GAZETTE.

5*th October*, 1892.—No. 4622—Mr. B. B. Osmaston, Assistant Conservator of Forests, on return from furlough, to the Direction Division of the Oudh Circle as Working Plans Officer.

No. 4625.—Mr. F. Beadon-Bryant, Deputy Conservator of Forests, on return from furlough, to the Direction Division of the Central Circle as Working Plans Officer.

5*th October*, 1892.—No. 4628.—Mr. W. Shakespear, Deputy Conservator of Forests, from the Pilibhit to the Ganges Division.

No. 4631.—Pandit Keshava Nand, Extra Assistant Conservator of Forests, Kheri Division, to the charge of the Pilibhit Division.

6.—PUNJAB GAZETTE,

17*th October*, 1892.—No. 468.—In Punjab Government Notifications Nos. 379 and 380, dated the 20 August 1892, Serial No. 20, in both lists and in the last columns, Mr. J. L. Pigot should be shown as "*Officiating Deputy Conservator of Forests, 3rd Grade*, seconded, on deputation" with effect from the 29th December 1891.

22*nd October* 1892.—No. 474.—*Notification.*—Mr. A. V. Monro, Assistant Conservator of Forests, on return from privilege leave, resumed charge of the Mooltan Forest Division on the forenoon of the 30th September 1892, relieving Babu Ladha Singh, Extra Assistant Conservator of Forests.

7.—CENTRAL PROVINCES GAZETTE.

28*th September*, 1892.—No. 3596.—Privilege leave for ninety days under Articles 277 and 291 of the Civil Service Regulations, is granted to Mr. P. H. Clutterbuck, Assistant Conservator of Forests, Raipur, with effect from the 8th September, 1892, or the subsequent date on which he may avail himself of it.

5*th October*, 1892.—No. 3711.—With reference to Government of India, Revenue and Agricultural Department, Notification No. 1037. F., dated the 12th August, 1892.

Mr. H. A. Hoghton, Deputy Conservator of Forests, reported his arrival at Nagpur on the forenoon of the 23rd August, 1892.

Mr. Hoghton is posted to the Seoni Forest Division.

On being relieved by Mr. Hoghton, Mr. V. S. Menzies, Assistant Conservator of Forests, Seoni Forest Division, will revert to the charge of the Nagpur-Wardha Forest Division.

No. 3712.—With reference to Notification No. 3711, dated the 5th October, 1892, Messrs. V. S. Menzies, Assistant Conservator of Forests,

and H. A. Hoghton, Deputy Conservator of Forests, respectively surrendered and received charge of the Seoni Forest Division on the afternoon of the 31st August, 1891.

No. 3713.—With reference to Notification No. 3711, dated the 5th October, 1892, Messrs. H. S. K. Edie and V. S. Menzies, Assistant Conservators of Forests, respectively surrendered and received charge of the Nagpur-Wardha Forest Division the afternoon of the 5th September, 1892.

No 3714.—With reference to Notification No. 2617, dated the 26th July, 1892, Mr. Ramchandra Krishna, Extra-Assistant Conservator of Forests relinquished charge of his duties in the Chanda Forest Division on the afternoon of the 16th August 1892.

No. 3715.—Khan Sahib Munshi Mahomed Ghouse availed himself on the afternoon of the 27th August, 1892, of the leave granted him by Notification No. 2618, dated the 26th July, 1822, making over charge of the Balaghat Forest Division to Mr. Ramchandra Krishna, Extra-Assistant Conservator of Forests.

No. 3929.—Under the provisions of Government of India, Revenue and Agricultural Department, Circular No. 18-F., dated the 29th July, 1891, the following changes in the position and designation of the officers of the Lower controlling staff of the Forest service in the Central Provinces, Berar and Coorg, shall have effect from the 26th February, 1891 :—

NAME.	FROM.	TO.
Mr. Chander Kumar Chatterji.	Sub-Assistant Conservator of Forests, 1st grade.	Extra- Assistant Conservator of Forests, 1st grade.
Khan Sahib Mahomed Ghouse ...	Do. do. ...	Do. do.
Mr. Mansukh Rai ...	Do. do. ...	Do. do.
Mr. Shridhar Ganesh Paranjpe ...	Do. 2nd grade ...	Do. 2nd grade.
Mr. Norman Chester McLeod ...	Do. do. ...	Do. do.
Mr. J. J. Hobday ...	Do. 3rd grade ...	Do. do.
Mr. C. H Haldane ...	Do. 2nd grade ...	Do. 3rd grade.
Mr. Ahmed Ali ...	Do. do. ...	Do. do.
Mr. Rasul Khan ...	Do. do. ...	Do. 4th grade.
Mr. Bukhan ...	Officiating do. 3rd grade.	Officiating do.
Mr. Ramchandra Krishna	Do. do. ...	Do. do.
Mr. R. C. Thompson.	Do. do. no probation.	Do. do. on. probation.

No. 3930.—Mr. Mahomed Kadar Buksh, Sub-Assistant Conservator of Forests, 3rd grade, sub. *pro tem.*, is appointed Extra-Assistant Conservator of Forests, 4th grade, sub. *pro tem.*, with effect from the 4th March, 1891.

No. 3931.—Mr. Shrinivasullu Naidu, Sub-Assistant Conservator of Forests, 3rd grade, on probation, is appointed Extra-Assistant Conservator of Forests, 4th grade, on probation, with effect from the 5th May, 1891.

No. 3932.—Mr. Ramchandra Krishna, Officiating Extra-Assistant Conservator of Forests, 4th grade, is appointed Extra-Assistant Conservator of Forests, 4th grade, sub. *pro tem.*, with effect from the 1st June, 1891.

No. 3933.—The following officers are confirmed in the 4th grade of Extra-Assistant Conservators of Forests, with effect from the 1st October, 1891 :—

Mr. Ramchandra Krishna, Extra-Assistant Conservator of Forests, 4th grade, sub. *pro tem.*

Mr. Mahomed Kadar Buksh, Extra-Assistant Conservator of Forests 4th grade, sub. *pro tem.*

Mr. Bukhan, Officiating Extra-Assistant Conservator of Forests, 4th grade.

No. 3934.—The following Extra-Assistant Conservators of Forests of the 4th grade are promoted to the 3rd grade, with effect from the 1st April, 1892 :—

Mr. Ramchandra Krishna.
Mr. Mahomed Kadar Buksh.

No. 3935.—Mr. R. C. Thompson, Extra-Assistant Conservator of Forests, 4th grade, on probation, is appointed Extra-Assistant Conservator of Forests of the 4th grade, sub. *pro tem.*, with effect from the 1st April, 1892.

No. 3936.—Mr. Shrinivasullu Naidu, Extra-Assistant Conservator of Forests, on probation, is appointed Extra-Assistant Conservator of Forests, 4th grade, with effect from the 1st April, 1892.

No. 3937 :—Mr. L. K. Martin is appointed as Extra-Assistant Conservator of Forests, 4th grade, on probation, with effect from the 24th July, 1892.

No 3938.—Mr. F. Seager is appointed as Extra-Assistant Conservator of Forests, 4th grade, with effect from the 24th August, 1892.

No. 3939.—The position of the officers of the Lower controlling staff of the Forest service in the Central Provinces, Berar and Coorg, stood as follows on the 25th August, 1892 : —

Name	Appointment.	Remarks.
Mr. Chander Kumar Chatterji.	Extra-Assistant Conservator of Forests, 1st grade.	
Khan Sahib Mahomed Ghouse ...	Do. do.	
Mr. Mausukh Rai ...	Do. do.	
Mr. Shridhar Ganesh Pranjpe ...	Do. 2nd grade.	
Mr. Norman Chester McLeod ...	Do. do.	
Mr. J. J. Hobday ...	Do. do.	
Mr. C. H. Haldane ..	Do 3rd grade.	
Mr. Ahmed Ali ...	Do. do.	
Mr. Ramchandra Krishna ...	Do. do.	
Mr. Mahomed Kadar Buksh ...	Do. do.	
Mr. Rasul Khan ...	Do. 4th grade.	
Mr. Bukhan ...	Do. do.	
Mr. R. C. Thompson ...	Do. do.	Supernumerary.
Mr. Shrinivasullu Naidu	Do. do.	
Mr. F. Seager ...	Do. do.	
Mr. L. K. Martin ...	Do. do.	On probation.

The 19*th October*.—1892.—No. 3945.—Mr. P. H. Clutterbuck, Assistant Conservator of Forests, availed himself, on the forenoon of the 6th instant, of the privilege leave granted him by Notification No. 3596, dated the 28th September, 1892, making over charge of the Raipur Division to Colonel W. S. Brooke, Deputy Commissioner.

8.—BURMA GAZETTE.

21*st September*, 1891.—No. 7.—With reference to Revenue Department Notification No. 105 dated Rangoon, the 16th June 1892, Mr. H. R. Thompson, Assistant Conservator of Forests, made over, and Mr. H. H. Forteath, Assistant Conservator of Forests, received, charge of the Upper Chindwin division on the afternoon of the 1st instant.

21*st September*, 1892.—No. 17.—With reference to Revenue Department Notification No. 279, dated Rangoon, the 16th September, 1892, Mr. F. J. Branthwaite, Officiating Deputy Conservator of Forests, received charge of the Toungoo division on the forenoon of the 20th September, 1892.

29*th September*, 1892.—No. 315.—Under the provisions of Article 291 of the Civil Service Regulations, privilege leave for 85 days is granted to Mr. W. A. Hearsey, Extra Assistant Conservator of Forests, with effect from the 1st October, 1892, or the subsequent date on which he may avail himself of it.

9*th October*, 1892.—No. 324.—The following alterations of rank are ordered in the Forest Department :—

(1) With effect from the 10th June, 1892 :—
Mr. C. R. Dun, Assistant Conservator of Forests, 2nd grade, to officiate as Assistant Conservator, 1st grade.

(2) With effect from the 9th July, consequent on the departure of Mr. E. A. O'Bryen on privilege leave :
Mr. C. R. Dun, Assistant Conservator, 2nd (officiating 1st) grade, to officiate as Deputy Conservator, 4th grade.

(3) With effect from the 20th July, 1892, consequent on the departure of Mr. C. H. Hobart-Hampden on privilege leave :
Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 3rd, to officiate as Deputy Conservator, 2nd grade.
Mr. C. L. Toussaint, Assistant Conservator, 1st grade, officiating Deputy Conservator, 4th grade, to officiate as Deputy Conservator, 3rd grade.

(4) With effect from the 2nd August, 1892, consequent on the return of Mr. H. B. Ward from privilege leave :
Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 2nd) grade, to officiate as Deputy Conservator, 3rd grade.
Mr. C. L. Toussaint, Assistant Conservator, 1st grade, officiating Deputy Conservator, 3rd grade, to officiate as Deputy Conservator, 4th grade.

(5) With effect from the 10th August, 1892, consequent on the departure of Mr. F. W. Thellusson on furlough :
Mr. T. A. Hauxwell, Deputy Conservator, 3rd (officiating 2nd) grade, to officiate as Deputy Conservator, 1st grade.
Mr. C. E. Muriel, Deputy Conservator, 4th (officiating 3rd) grade, to officiate as Deputy Conservator, 2nd grade.

Mr. C. L. Toussaint, Assistant Conservator, 1st grade officiating Deputy Conservator, 4th grade, to officiate as Deputy Conservator, 3rd grade.

(6) With effect from the 17th August, 1892, consequent on the transfer of Mr. H. A. Hoghton to the Central Provinces, and pending the arrival of Mr. H. B. Anthony :

Mr. G. Q. Corbett, Deputy Conservator, 4th (officiating 3rd) grade, to officiate as Deputy Conservator, 2nd grade.

Mr. F. J. Branthwaite, Assistant Conservator, 1st, officiating Deputy Conservator, 4th grade, to officiate as Deputy Conservator 3rd grade.

(7) With effect from the 16th September, 1892, consequent on the transfer of Mr. H. B. Anthony to Burma :

Mr. H. B. Anthony, Deputy Conservator, 4th grade, to officiate as Deputy Conservator, 2nd grade.

Mr. G. Q. Corbett, Deputy Conservator, 4th (officiating 2nd) grade, to officiate as Deputy Conservator, 3rd grade.

Mr. F. J. Branthwaite, Assistant Conservator, 1st, officiating Deputy Conservator, 3rd grade, to officiate as Deputy Conservator, 4th grade.

13*th October*, 1892.—No. 325.—The following postings and transfers are ordered in the Forest Department :—

Mr. C. W. Palmer, Deputy Conservator of Forests, on his return from leave, to the charge of the Minbu Forest division.

Mr. C. W. A. Bruce, officiating Deputy Conservator of Forests on his return from leave, to the charge of the Upper Chindwin Forest division.

Mr. H. H. Forteath, Assistant Conservator of Forests, to the headquarters of the Upper Chindwin Forest division.

Mr. A. M. Burn-Murdoch, Assistant Conservator of Forests, from Minbu to the charge of the Magwe sub-division of the Minbu Forest division.

3*rd October*, 1892.—No. 18.—With reference to Government of India, Revenue and Agricultural Department Notification No. 1037F., dated the 12th August, 1892, Mr. H. A. Hoghton, Deputy Conservator of forests, made over charge of his duties in this office on the afternoon of the 16th August, 1892.

8*th October*, 1892.—No. 19.—With reference to Revenue Department Notification No. 252F., dated the 27th August, 1892, Mr. E. B. Powell, Extra Assistant Conservator of Forests, made over charge of the Myanaung sub-division on the forenoon of the 12th instant and assumed charge of his duties in the Tharrawaddy division on the afternoon of the 16th instant.

No.—With reference to Revenue Department Notification No. 280 F., dated the 10th September, 1892, Mr. F. J. Branthwaite, officiating Deputy Conservator of Forests, assumed charge of the Pegu sub-division on the afternoon of the 28th ultimo.

13*th October*, 1892.—No. 9.—Mr. W. A. Hearsey, Extra Assistant Conservator of Forests, availed himself of the privilege leave granted to him in Revenue Department Notification No. 315 (Forests), dated Rangoon, the 29th September, 1892, on the forenoon of the 3rd October, 1892.

14*th October* 1892,—No. 326.—(CORRIGENDUM).—In the heading to the form prescribed in Revenue Department Notification No. 98, dated the 17th March, 1892, *for* "VII A" *read* "VII B."

No. 327.—In exercise of the power conferred by section 37 of the Burma Forest Act, 1881, and in supersession of the notifications superseded thereby, the Chief Commissioner prescribes the following rules to regulate the matters referred to in clauses *(c)*, *(d)*, *(g)*, and *(h)* of the said section :—

8. No person shall cut, saw, convert, or remove any tree other than a reserved tree on any land at the disposal of Government, not included in a reserved forest or village forest, or the timber of any such tree, unless either—

(a) such tree or timber is cut, sawn, converted, or removed for the building of bridges, rest-houses, or other works of public utility; or

(b) such tree or timber is cut, sawn, coverted, or removed for use within the revenue circle wherein, or within 5 miles of the place in which such tree or timber is produced for *bona fide* agricultural, fishery, or domestic purposes; or

(c) such tree or timber is cut, sawn, converted, or removed for immediate conversion into firewood within the limits of the forest in which it is cut and before passing the station at which revenue would be ordinarily payable; or

(d) such tree or timber is cut, sawn, converted, or removed for the purposes of burning charcoal by a person possessing a license in Form VIII; or

(e) such timber is cut, sawn, converted, or removed under and subject to the conditions of a license granted by the Deputy Commissioner, or Forest Officer of the district, or by any officer empowered by the Deputy Commissioner in that behalf in one or other of the Forms Nos. VI, VIA, VII. VIIA, VIIB, IXA, and IXB given in the Appendix to these rules.

Provided, however, that—

(1) No one shall cut, fell, or lop *than* trees on any such land for the purpose of manufacturing *thansha* or collect or remove *than* timber for such purpose.

(2) No person shall cut trees within two chains of the bank of any stream to which the Deputy Commissioner of the district in which the stream is situated may by public notice declare this rule to apply. The notices published under this rule shall specify the points on the stream referred to between which the cutting of trees is prohibited, and shall be served on the headmen of all villiages near and posted up at convenient places in such villages and along the stream. The Deputy Commissioner may cancel or vary by publication in similar manner any notices issued under this rule.

(3) On all firewood brought to Rangoon there shall be levied the following fees :—

	Rs.	A.	P.
On firewood not exceeding 6 feet in length and 2 feet in girth, per 1,000 billets	10	0	0
On firewood not exceeding 4 feet 6 inches in length and 2 feet in girth, per 1,000 billets	8	0	0
On firewood not exceeding 4 feet 6 inches in length and 1 foot in girth, per 1,000 billets	2	8	0
On firewood not exceeding 3 feet in length and 1 foot in girth, per 1,000 billets	1	0	0
On firewood small, in bundles of 10, not exceeding 1 foot in length, per 1,000 bundles	1	0	0

The above fees shall be paid at one or other of the collecting stations at Alôn, Pazundaung, Botataung, Williams street wharf, or Sinmaleik, and no firewood shall be removed until the fees payable in respect thereof have been paid.

9. No person shall collect or remove wood-oil or resin, the natural produce of any land at the disposal of Government, not included in a reserved or village forest, except under and in accordance with the conditions of a license granted by the Deputy Commissioner, or Forest Officer of the district, or by an officer empowered by the Deputy Commissioner in that behalf, in one or other of the Forms X and XI, given in the Appendix to these rules.

a. No person shall burn charcoal on any land at the disposal of Government and not included in a reserved or village forest, except under and in accordance with the conditions of a license granted by the Deputy Commissioner or the Forest Officer of the district, or by any officer empowered by the Deputy Commissioner in that behalf, in Form VIII given in the Appendix to these rules

9*b*. No person shall make use of the natural produce of any land at the disposal of Government and not included in a reserved or village forest other than natural produce of the kinds referred to in Rules 8 to 9*a*, except under and in accordance with a license granted by the Deputy Commissioner or the Forest Officer of the division or by any officer empowered by the Deputy Commissioner in that behalf for such time and on such conditions as the said Deputy Commissioner or Forest Officer may prescribe.

Provided that in any district in which the Deputy Commissioner deems it unadvisable to issue licenses for the making use of any particular kind of natural produce to which this rule applies, the Deputy Commissioner or the Forest Officer of the division may sell by public auction annually, to the highest bidder, the right to collect such produce in any defined or demarcated tract.

10. Any person infringing Rule 5, or Rule 8, or Rule 9, or Rule 9*a*, or Rule 9*b*, shall be punishable with imprisonment for a term which may extend to six months, or with fine which may extend to Rs. 500, or with both.

No. 328.—With reference to the foregoing notification, the Chief Commissioner directs that so much of clause (*e*) of Rule 8 as prescribes Forms VIA and VIIA shall not come into force till the 1st January, 1893.

No. 329.—In exercise of the power prescribed by section 37 of the Burma Forest Act, 1881, the Chief Commissioner directs that the figure and letter "9*a*" shall be substituted for the figure "8" in the form prescribed in Revenue Department Notification No, 267, dated the 17th November 1891.

No. 333.—In exercise of the power conferred hy section 46 of the Burma Forest Act, 1881 the Chief Commissioner directs that in Revenue Department Notification No. 75 dated the 30th May 1890, the following words, namely.

"Clauses (*a*) to (*d*) of Rule 8 of the rules published in Revenue Department Notification No. 327, dated the 14th October, 1892,"

shall be substituted for the words—

"Clauses (*a*) to (*c*) of sub-head (1), Rule 8 of the rules published under this Department Notification No 11 (Forests) dated the 10th January 1883, as revised by this Department Notification No. 108 (Forests), dated the 1st August, 1889."

No. 331.—In exercise of the power conferred by section 43 of the Burma Forest Act, 1881, the Chief Commissioner makes the following amendments in Rules 12 and 23 of the Lower Burma Forest Rules published in Revenue Department Notification No. 15, dated the 23rd January, 1892, and No. 76, dated the 30th May 1890 :—

1. In proviso (*b*) of Rule 12 *for* "Rule 8 (*b*)" *read* "Rule 8 (*b*) and (*d*)."

2. In Rule 23, clause (*a*), for "Rule 8, sub-head (1), clauses (*a*) and (*b*)," *read* "Rule 8, clauses (*a*) and (*b*)."

No. 332.—In exercise of the power conferred by section 40 of the Burma Land and Revenue Act, 1876, and with the previous sanction of the Governor-General in Council, the Chief Commissioner makes the following rules to provide for the disposal of certain kinds of forest produce. These rules supersede Rules 121, 122, and 123 of the rules published in Revenue Department Notification No. 151, dated the 4th September 1890 :—

121. No person shall prepare or collect any produce of the kinds referred to in the abovementioned section, other than produce of the kinds referred to in Rules 8, 9, and 9*a* of the rules under the Burma Forest Act, 1881, published in Revenue Department Notification No. 327, dated the 14th October, 1892, except under and in accordance with, a license granted by the Deputy Commissioner, or the Forest Officer of the division, or by any officer empowered by the Deputy Commissioner in that behalf, for such time and on such conditions as the said Deputy Commissioner or Forest Officer may prescribe.

Provided that in any district in which the Deputy Commissioner deems it unadvisable to issue licenses for the making use of any particular kind of produce to which this rule applies, the Deputy Commissioner or the Forest Officer of the division may sell by public auction annually to the highest bidder the right to collect such produce in any defined or demarcated tract.

122. Any person who shall prepare or collect any produce of the kinds mentioned in Rule 121 without having acquired the right to do so in the manner provided in Rule 121 may, in addition to any other consequences to which may be liable, be punished on conviction before

a Magistrate with rigorous or simple imprisonment for a term not exceeding one month, or with a fine not exceeding Rs. 100, or with both.

17*th October*.—No. 333.—Mr. W. T. T. McHarg, Assistant Conservator of Forests, is transferred from Katha to the Mandalay Forest division.

No. 334 (CORRIGENDUM).—In this department Notification No. 295 dated the 20th September 1892, *for* "Nyaungbin" *read* "Nyaunglun" in the two places where the former word occurs.

20*th Oetober*, 1892.—No. 349.—Mr. A. L. Home, Conservator of Forests, on his return from furlough, is posted to the charge of the Western Forest Circle, Upper Burma.

No. 350.—Mr. T. H. Aplin, Officiating Conservator of Forests, Western Circle, Upper Burma, on being relieved by Mr. A. L. Home, is posted to the charge of the Lower Chindwin Forest division.

No. 351.—Mr. H. N. Thompson, Assistant Conservator of Forests, on being relieved of the charge of the Lower Chindwin division, is appointed to do duty as subdivisional Officer in the Lower Chindwin division.

No. 352.—Under the provisions of section 43, clause (*g*) of the Burma Forest Act, 1881, the Chief Commissioner is pleased to add the following place to the list of stations to which timber or other forest produce in transit shall be taken by those in charge of it for examination or for the realization of any money payable to Government in respect thereof, or in order that any mark may be affixed thereto :—

Pegu Forest Circle.

Thayetmyo division,—Minhla.

20*th October*, 1892.—No. 358.—In exercise of the power conferred by section 40 (2) (*g*) of the Upper Burma Forest Regulation, 1887, and in supersession of previous notifications, the Chief Commissioner adds the following rule to the rules under the Upper Burma Forest Regulation :—

32 (*a*) The undermentioned places are established as revenue stations to which forest produce shall be taken by the person in charge of it for examination, and for the realization of any money payable to Government and for the purpose of affixing marks thereto :

Eastern Forest Circle.

Division.	Revenue station.	Civil district in which station is situated.
Bhamo.	Bhamu ... ... Shwegu	Bhamo
Katha ...	Katha ... ... Dobin ... ... Kyundaung ... ... Tigyaing ... ... Kyanhnyat	Katha.

Mandalay	Madaya	Mandalay.
	Mandalay including Nanda kyun	
	Ava* including Amarapura *and Saging.†	*Mandalay.† Sagaing.
	Paleik	
	Kyaukse	Kyaukse
	Myitha	
	Thedaw Railway station ...	Meiktila
	Meiktila Road Railway station ...	
Mu ...	Kyunhla	Ye-u
	Ye-u	
	Shwebo	Shwebo.
	Kyaukmyaung	
	Myinmu	Sagaing.
Pyinmana	Pyawbwe	Yamethin.
	Yamèthin	
	Pyinmana	Pyinmana.
	Yeni	

Western Forest Circle.

Division.	Revenue Station.	Civil district in which station is situated.
Yaw	Pakôkku	Pakôkku.
Upper Chindwin ..	Kindat	Upper Chindwin.
Lower Chindwin ...	Alôn, Chindwin river ...	Lower Chindwin.
Minbu ...	Zigat* (including Salè)* ...	*Pakôkku. †Myingyan
	Mingôn*	*Magwe.
	Mezali, Môn river	Minbu.

No. 359.—In exercise of the power conferred by section 40 of the Upper Burma Forest Regulation, 1887, the Chief Commissioner makes the following amendments in the rules under the said Regulation :—

Rule 15.—Omit the words "appointed by the local Government in this behalf."

Rule 16—Omit the words "appointed by the local Government in this behalf."

Rule 25, clause (I).—Omit the word and figures "and 31," and *for* the word "apply" *read* "applies."

9.—ASSAM GAZETTE.

12*th October*, 1892.—No. 9131G.—Mr. J. E. Barrett, Deputy Conservator of Forests, on return from leave, is placed in charge of the Cachar Forest Division.

12*th October*, 1892.—No. 9132G.—Mr. G. H. Young, Deputy Conservator of Forests, Cachar Forest Division, on being relieved by Mr. J. E. Barrett, is placed in charge of the Kamrup Forest Division.

12*th October*, 1892.—No. 9133G.—Mr. A. M. Long, Assistant Conservator of Forests, Kamrup Forest Division, on being relieved by Mr. H. G. Young, is placed in charge of the Sibsagar Forest Division.

12*th October*, 1892.—No. 9134.—Mr. D. P. Copeland, Deputy Conservator of Forests, on return from privilege leave, is placed in charge of the Darrang Forest Division.

10.—HYDERABAD RESIDENCY GAZETTE.

19*th September*, 1892.—No. 278.—In consequence of the amalgation of the Controlling staff of the Forest Department of the Punjab, with those of the Central Provinces, Berar and Coorg, in accordance with Government of India Circular No. 30-F., dated the 29th December, 1891, the following list is published; showing the names and position of the officers on the combined lists on the 29th December 1891 :—

Serial number in list.	Name.	Position.
	Same as in Punjab Gazette, Notification No. 379 dated 20th August, 1892, *vide* September number of the *Indian Forester*.	

19*th September*, 1892.—No. 279.—Consequent on the appointment to the Central Provinces of Mr. H. S. K. Edie, *vide* Government of India Notification No. 532-F. dated the 6th May 1892, the amalgamated list of the Punjab, Central Provinces, Berar and Coorg, will on the 31st December 1891, stand as follows :—

Serial number in list.	Name.	Position.
	Same as in Punjab Gazette, Notification No. 380 dated 20th August, 1892, in September number of the *Indian Forester*.	

19*th September*, 1892.—No. 280.—Consequent of the transfer to the Imperial List of Mr. A. E. Wild, on his appointment as Conservator of of Forests, 3rd grade, *vide* Government of India Notification No. 526-F., dated 6th May 1892, the following promotions shall have effect from the 17th January 1892 :—

See Punjab Gazette Notification, No. 381, dated 20th August, 1892, as above.

19*th September*, 1892.—No. 281.—Consequent on the departure of Mr. F. S. Barker, Officiating Deputy Conservator of Forests, 2rd grade, on leave on medical certificate for 12 months, the following promotions shall have effect from the 22nd January 1892 :—

See Punjab Gazette Notification, No. 382, dated 20th August, 1892, as above.

19*th September*, 1892.—No 282 —Consequent on the return from furlough of Mr. W. King, Deputy Conservator of Forests, 4th grade, the following changes shall have effect from the 8th February 1892 :—

See Punjab Gazette Notification.—No 383 dated 20th August, 1892, as above.

19*th September*, 1892.—No. 283 —Consequent on the return from leave of Mr. G. S. Hart, Assistant Conservator of Forests, 1st grade, the following changes shall have effect from the 13th February 1892: —

See Punjab Gazette Notification.— No. 384 dated 20th August, 1892, as above.

19*th September*, 1892.—No. 284.—Consequent upon the death of Mr. A. J. Mein, Deputy Conservator of Forests, 3rd grade, the retransfer from Assam to the Punjab of Mr. A. M. Reuther, Deputy Conservator of Forests, 4th grade, and the transfer of Mr. J. L. Pigot, Deputy Conservator of Forests, 4th grade, from the Central Provinces to Assam, the following changes shall have effect from the 2nd of March 1892 :—

See Punjab Gazette Notification.—No. 388 dated 20th August, 1892, as above.

19*th September*, 1892 —No. 285.—Consequent on the appointment of Mr. R. H. E. Thompson, Deputy Conservator of Forests, 1st grade, as Conservator of Forests, 4th grade, *vide* Government of India Notification No. 594-F., dated the 20th May 1892, the following promotions shall have effect from the 4th of April 1892 :—

See Punjab Gazette Notification.—No. 386, dated 20th August, 1892, as above.

19*th September*, 1899.—No. 286.—Consequent on the return from deputation in the Patiala State of Mr. G. G. Minniken, Deputy Conservator of Forests 2nd grade, the following changes shall have effect from the 5th May 1892 :—

See Punjab Gazette Notification.—No. 387 dated 20th August, 1892 as above.

19*th September*, 1892.—No. 287.—Consequent on the departure on three months' privilege leave of Mr. H. B Authony, Deputy Conservator of Forests, 4th grade, the following promotion shall have effect from fo the 8th June 1892 :—

See Punjab Gazette Notification.—No. 388 dated 20th August, 1892, as above.

22*nd September*, 1892.—No. 201.—In supersession of so much of *Residency Orders* notification No. 256, dated the 24th August 1892, as relates to the pay of Mr. Martin, Probationary Extra Assistant Conservator of Forests in Berar, the Resident is pleased to direct that that officer shall draw Rs. 150 per mensem with effect from the 24th July 1892.

4*ih October*, 1892.—No. 302.—The Resident is pleased to declare that Mr. E. M. Coventry, an Assistant Conservator of Forests, in Berar, has passed the examination prescribed for Forest Officers in the Hyderabad Assigned Districts in the subject and by the standard noted below :—

Lower Standard.

1. Land Revenue.
2. Forest Law.
3. Hindustani.

11.—MYSORE GAZETTE.

12*th October*, 1892.— No. 5162—G. 1242-92.—The 10 days' casual leave granted to Mr. B. Ramaswami Iyer, Officiating Assistant Conservator of Forests, Kadur District, in Notification No. 94 of the 4th May 1892, is hereby commuted into privilege leave and extended to 20 days with effect from such date as he may avail himself of the same.

INDIAN WOODS FOR TEA-BOXES.

The question of the possibility of starting a trade in tea-boxes manufactured from Indian woods has recently occupied the attention of the Inspector-General of Forests. Enquiries were made of Messrs. Davenport & Co., Calcutta, who are large importers of Japanese tea-boxes for supply to tea-gardens in India, and it appears from the particulars supplied by that firm that they annually import, or expect in the near future to import, some 1,500,000 boxes made of red Pine (*P. Thunbergii*) from Japan, of uniform tare, *viz.*, 19lb, and with the dimensions 23″ × 19″ × 18″ with 2″ dovetails.

There is no doubt that there is a very great opening for some good light tea-box which must, however, be sold in Calcutta for not more than 14 annas each, so as to leave a margin of profit both for the producer and middleman. The main points to be kept in view are that the boxes must not be heavier or more expensive than the Japanese boxes, and that the wood must be sweet smelling and free from all kind of taint.

Before people can be induced to take up the trade, the right kind of wood must be found in sufficient quantity and in suitable situations.

Sample tea-boxes made from Japan wood were sent to the Chief Forest Officers of Assam, the Andamans, and the Pegu Circle, Burma, who were asked to ascertain whether suitable woods for the manufacture of tea-boxes were obtainable in the forests under their charge. The opinions of these officers are embodied in the following *précis* of their reports, to which has been added information bearing on the subject already published in the *Indian Forester*, etc.

I.—ASSAM.

In 1883 the question was raised whether Government could do anything to improve the tea-boxes now generally in use, and the Inspector-General of Forests called on the Conservator of Forests for a memorandum on the subject, the main points and questions for consideration being—

(1) that the boxes were badly made;
(2) that certain species of wood had damaged the tea;
(3) how the making of the boxes could be improved;
(4) is the corrosion of the tea-lead due to the fact that unseasoned wood is used?
(5) which Assam woods are specially suited, and which are unsuited for tea-boxes?

(6) a rough estimate of the quantity of timber required annually for tea-boxes, and the quantity of timber of the kind recommended available in Assam, as well as the localities where such timber is available.

The following is an abstract of the note submitted by the Conservator of Forests :—

If the planters' own interests are not a sufficient inducement to make them manufacture good boxes, nothing the Government can do will influence them in the least. Next to good workmanship, perhaps dovetailing (which is not always done) and good iron-hooping instead of cane-hooping, as is still used in many gardens, would also be improvements; and, as a matter of course, a smaller box, say half maund box, would be less likely to get damaged than the present boxes, but that means additional expense, which, with the present low prices, has to be avoided.

I have arrived at the conclusion that there is no wood in Assam, if properly seasoned, that will damage the lead in which the tea is packed; if not seasoned, the extent to which the different woods damage tea-lead must vary greatly. I think there is little or no doubt that almost any wood will spoil tea-lead if used without being seasoned,[1] and I have seen unpardonable recklessness in this respect within the last two or three years, inasmuch as wood quite green was cut down and brought to the factory one day, sawn up the next, and used as soon as required, which might be within a week or two of the time the tree was cut down. The reason for this recklessness, which was never noticed in former years, is that when tea-boxes were imported or sawn up by hand, the wood became seasoned before the box was made; but now-a-days nearly every garden has an engine to roll tea, and in the cold weather it is used for working a small saw bench with a circular saw to cut planks for tea-boxes.

As a matter of course, a light tough wood, easily worked, always recommends itself for boxes in preference to heavy and hard or brittle wood difficult to work; and, since in our mixed forests in the tea districts the soft woods greatly predominate, there is at present an abundance of wood for tea-boxes; and, what is of most importance, most of these soft wood trees take only from thirty to forty years to reach a girth of 5 to 6 feet. This, together with the very scanty population in the province, and, comparatively speaking, the small forest areas now jhumed, are my reasons for estimating that there is a superabundance of this wood, and that for the next twenty years only a portion of what is available can be used, and we shall be able to meet all demands from our reserves.

[1] The subject of corrosion of the lead linings of Indian tea-boxes is dealt with in the *Indian Forester*, Volume X, 1884, pages 484 and 529, and in a Memorandum by Mr. A. Pedlar, Journ. Asiat. Soc., Bengal, Vol. LIV, Part II, No. 3, 1885.

An additional reason I have for thinking that our supplies are ample is that tea-planters will in future use little or no wood for fuel and charcoal for drying tea, since the coal mines near Makum are now opened out, and supply good coal which makes magnificent coke, both of which will be sold very reasonably.

It is not unlikely that the tea industry will largely increase, and I firmly believe that Indian tea will, to a great extent, supplant China tea, so that we shall have to provide for an increased demand for tea-box wood. This I consider can be met from the forests in the extreme east of the Brahmaputra valley, which are very extensive, but in which, for political reasons, we cannot just yet introduce forest conservancy.

The localities in which our mixed forests containing the wood best suited for tea-boxes exist are in the Brahmaputra valley, the country along the foot of the Himalayas from the Bor-Nadi opposite Gauhati, or the western boundary of the Darrang District, eastwards to the upper end of the valley, and on the south side the country at the foot of the Naga hills beginning in the west with the Nambar reserves and a large extent of forest south of them, all along through the Sibsagar District to Makum and the head-waters of the Buri and Noa Dehing as well as the Brahmaputra river.

In the Surma Valley we depend chiefly on the Cachar reserves, supplemented by what will be brought from Manipur and the Lushai Country.

As to the estimate of the quantity of timber required annually for tea-boxes, this can be pretty accurately made. The tea exported in 1881-82 from the Brahmaputra valley was 288,754 maunds, and, reckoning one cubic foot of timber for every maund of tea, which is pretty accurate, we require at present 288,754 cubic feet.

The exports of tea from 1882-91 are shown by the following table :—

	Exports of tea from	
	Brahmaputra Valley.	Surma Valley.
	Mds.	Mds.
1882-83	384,478	209,653
1883-84	337,717	196,954
1884-85	365,443	189,171
1885-86	428,021	176,748
1886-87	353,473	293,542
1887-88	461,499	313,123
1888-89	521,275	318,653
1889-90	545,378	369,019
1890-91	544,364	383,261

Mr. McKee, Officiating Conservator of Forests, reported (1892) that Mr. Fordyce considers Makai (*Shorea Assamica*) an unsuitable

wood for the purpose because of its comparative scarcity and because of its tendency to warp when cut into small scantling. Moreover, it pays better to sell the Makai trees standing at R6 per tree than to convert the timber into tea-boxes on which it is very doubtful if any profit could be made at the low price of annas 14 per box delivered in Calcutta.

There is little doubt that Assam possesses only one kind of suitable timber in sufficient abundance, *viz.*, Simul (*Bombax malabaricum*), and it is also nearly certain that the only opening for starting a departmental mill would be either at Gauhati or Dhubri, from which places freight to Calcutta would be moderate, and in which no private mills at present exist to create competition. But it is doubtful whether there is a sufficient supply of Simul within a reasonable distance to permanently feed a mill at either of these places. It must also be borne in mind that the tea-box industry is increasing in Assam. During the past year 394,129 boxes were made at Tezpur and Lakhimpur from wood obtained from the Forest Department, paying R17,792.

In a further letter Mr. McKee writes that it is likely that the local saw-mills of Lakhimpur, Darrang, and Cachar will before long supply the greater part of the box demand. All the gardens of these districts are now supplied by local mills, which obtained their timber either from the Forest Department or from private grants, and there are reasons for believing that the number of mills will be increased before long, as it is found that boxes can be supplied by them at nearly half the rate charged by the Calcutta houses, and of sufficiently good material. Tea-boxes in Assam are generally made from *Bombax malabaricum*, *Duabanga sonneratioides*, *Dipterocarpus turbinatus*, and one or two other light and inferior woods. When such wood is supplied to the mills by the Forest Department, a royalty of one anna per box is collected on the outturn, which it has been calculated is worth about R2 per tree.

The following statement of tea-boxes made from Government timber shows that the trade is a growing one:—

Year.	Number of boxes, large.	Number of boxes, medium.	Number of boxes, small.	Total number of boxes.	Royalty paid.
					R
1888-89 .	112,329	...	6,328	118,657	7,218
1889-90 .	95,293	1,021	9,670	105,984	6,305
1890-91 .	139,272	11,422	13,457	164,144	9,659
1891-92 .	347,499	24,738	21,890	394,127	17,792

In the *Indian Forester*, Volume X, 1884, page 243, a correspondent

considered that Roghu or Kadam (*Anthocephalus Cadamba*) is one of the best woods for tea-boxes, both on account of its natural qualities as a wood and as a tree, the growth being remarkably rapid for the first six or eight years. Ten-inch planks for boxes were cut out of trees only eight years old, and trees sixteen years old were felled, which, at 6 feet up, measured an average of 5 to 5 feet 5 inches girth, and, at 30 feet, 3 feet 8 inches in girth.

In the *Indian Forester*, Volume IX, 1883, page 611, Mr. Young, Assistant Conservator of Forests, Cachar Division, records an experiment made with green wood of the wild mango (*Mangifera sylvatica*), from which it was pretty evident that it possesses chemical properties injurious to tea lead, which are either dissipated or otherwise rendered harmless by seasoning, the corrosion of the lead coating of tea-boxes being generally due to the use of green wood still containing sap. Considerable loss was reported in 1884 as having been incurred by shippers owing to the choice of unsuitable wood (for tea-chests in China), especially that of the wild mango.

II.—Andamans.

Mr. Chester, Deputy Conservator of Forests, reports that he, some months ago, cut up a quantity of Didu (*Bombax insigne*) wood for tea-boxes and, after seasoning, cut it into planks of the size furnished by Messrs. Williamson, Magor & Co., Calcutta, for tea-boxes. Samples were sent to Messrs. Gillanders, Arbuthnot & Co., who valued them (without being cut in tenon and mortice) at 14 annas per box, and Mr. Chester expected soon to have an offer through them.

III.—Burma.

Mr. Carter, Conservator of Forests, reports that there are two common trees which, when converted into tea-boxes, may possibly compete with Japanese wood in the Calcutta market. These are *Bombax insigne* (Didu) and *Hymenodictyon excelsum* (Kusan). Arrangements were made for the delivery at Rangoon of 25 logs of each, and the Bombay-Burma Trading Corporation have undertaken to convert them into tea-boxes and send them to Calcutta for sale, if the expenses incurred do not prevent competition with the Assam boxes.

Kanyin (*Dipterocarpus*[1]) is very much heavier than the Japanese wood. The Manager of the Bombay-Burma Trading Association writes :—"I do not think kanyin has ever been tried for tea-boxes, and I doubt if it would be found suitable. We tried it some years ago for Cutch, but had to give it up as, by the time the shipment reached home, half the boxes were in pieces."

[1] *Dipterocarpus turbinatus*—"Mason says the Burmese distinguish two forms of this plant—*kanyin* (*ni*) red and *kanyin* (*phu*) white; but the latter, according to modern writers, is *D. alatus*."—*Dict., Econ. Prod., Ind.*

Major Bingham, Conservator of Forests, Tenasserim, reports as follows :—

We do not as a rule extract kanyin in this circle by Government agency, for the cost of extraction is so heavy that it pays better to issue licenses for it. Kanyin was made a reserved wood here on 20th October, 1890, and under trade and prepaid licenses we charge R10 and R8 per ton respectively. When kanyin was reserved, a large number of logs were left felled in the forest by licensees, as they said that, under the enhanced rates, as reserved timber it did not pay them to extract. These logs were brought out by Government agency, and with difficulty we got them down by paying the high rate of R7 per ton for extraction. At our timber sales it was found that the prices obtained were R12 and R12-8 per ton, thus leaving us only a small profit. So far to show that it does not pay to extract kanyin by Government agency for sale here.

For tea-boxes the calculation is as follows. Allowing for heart-shake, splitting, and waste, it is calculated that 2 tons of kanyin in the round will yield 1 ton of ½-inch boards, and 1 ton of ½-inch boards will give 60 tea-boxes (23″ × 19″ × 18″ and 2″ dovetails). Conversion in Moulmein is high, and the lowest quotation I can get for it is R10 per ton in the round. Packing comes to R7 for 60 boxes.

EXPENDITURE ON 60 BOXES.

	R	a.	p.
Extraction 2 tons kanyin . . .	14	0	0
Conversion	20	0	0
Packing	7	0	0
Shipping charges, etc., in Moulmein .	2	0	0
Freight	10	0	0
Total .	53	0	0

delivered f. o. b. at Calcutta.

At the price mentioned, *viz.*, annas 14 per box, 60 boxes would realise only R52-8, so that the trade would not pay at all.

Again, this would be for boxes that would have to be nailed together. To have the board lengths cut out for dovetailing would bring the charge for conversion to double (if not more) the amount quoted.

In weight, again, kanyin is too heavy, as will be seen from the following calculation. The cubical contents of the boards to make a box of the size indicated are —

2 boards top and bottom . . . 24″ × 19″ × ½″
2 sides „ „ . . . . 24″ × 19″ × ½″
2 ends „ „ . . . . 19″ × 19″ × ½″

$$= \frac{2 \times 67'' \times 19'' \times \frac{1}{2}''}{1{,}728} =$$ approximately ⅓ of a cubic foot.

Gamble, in his Manual of Indian Timbers, gives the average weight of Burma kanyin wood thoroughly dried as 46lb. Then ⅔ of 46lb is nearly 31lb.

IV—Bengal.

Mr. Dansey, Conservator of Forests, states that, having regard to the nature of the country, the difficulty of obtaining labour for the ordinary requirements of the tea concerns, and the very few local species of any use for the purpose, he does not think it strange that Bengal should not be able to compete with Japan in this particular industry.

The Kurseong Divisional Officer points out that shook boxes made from Japan wood are a little dearer than those made in the district, but that Managers consider the advantages of the latter to more than compensate for the difference in cost. Roughly, in the Terai the shook boxes cost ₹1-4 each, and those made from local wood ₹1-1-3 to ₹1-2-6, but the price varies very much.

In the *Indian Forester*, Volume IX, 1883, pages 28 and 377, the following list of common tea-box woods in Darjeeling is given by Mr. Gamble :—

(*a*) Terai.

Indian names.	*Botanical names.*
Toon.	Cedrela Toona, microcarpa or glabra.
Lampatia.	Duabanga sonneratioides.
Simul.	Bombax malabaricum.
Goguldhup.	Canarium bengalense.
Kadam.	Anthocephalus Cadamba.
Mandania.	Acrocarpus fraxinifolius.
Mainakat.	Tetrameles nudiflora.
Udal.	Sterculia villosa (bad).

(*b*) Hills.

Toon.	
Kabashi.	Acer Campbellii or lævigatum.
Mahua.	Engelhardtia spicata.
Gobria.	Echinocarpus dasycarpus.
Chilauni.	Nyssa sessiflora.
Lepchaphal.	Machilus edulis.
Tarsing.	Beilschmiedia Roxburghiana.

Mr. Gamble also states that in Chittagong Toon and other woods not well known are used, and that in Chota Nagpur he has seen Salai (*Boswellia thurifera*) used.

In a letter to the writer Mr. Gamble suggests that, in Chittagong, a floating water-wheel mill, such as one sees on the Rhine, made to work both ways according to the tide, might be set up at Kaptai or Chandragunа, and wood floated down to it from the huge forests of the Miani and Ruikheong. Toon, Bombax, Gmelina, and other soft woods could be got in sufficient abundance, and the cutting and extraction would be cheap, as also would the transit to Calcutta.

V.—Punjab.

In the *Indian Forester*, Volume IX, 1883, page 211, Mr. L. Gisborne Smith gives the following list of tea-box woods used by planters of the Kangra District :—

Palampur Tehsil.

Indian names.	*Botanical names.*
Chil	Pinus longifolia.
Rai.	Abies Webbiana.
Tos.	„ Smithiana.
Oi.	Albizzia stipulata.
Tún.	Cedrela Toona.
Mango.	Mangifera indica.[1]
Simul.	Bombax malabaricum.

Kullu Tehsil.

Kail.	Pinus excelsa.
Rai.	Abies Smithiana (called Tos at Palampur).
Tos.	Abies Webbiana (called Rai at Palampur).

These are chiefly used, though there are several other woods which Mr. Smith had no doubt would answer the purpose, such as Alder, Elm, Poplar (Phalse), hill Tún and Chil. Deodar is not used for tea-boxes owing to its strong smell of turpentine.

IN OIL, RESIN OF URCEOLA ESCULENTA, AND THITSI VARNISH.

The following notes on the Burmese In oil, resin of Urceola esculenta and Thitsi varnish were received in response to a circular issued by the Inspector-General of Forests in connection with collections of Forest products for the Imperial Institute, London.

I.—In or Eng Oil.

(*Dipterocarpus tuberculatus.*)

In the Zamayi range Eng oil is extracted in small quantities for making torches, which, when manufactured, sell at the rate of ₹4 per 100. The method followed in obtaining the oil is as follows :—

From January to April trees of 6 feet girth and upwards are selected. In these trees, at a height of about 3 feet from the ground, incisions 9″ to 10″ deep and about 1′ wide are made into the heart-wood of the Eng tree. This incision is concave at the bottom, the concavity being large enough to hold from 20 to 50 ticals weight of the oil. The number of incisions varies from one

[1] Mr. Gamble informs me that in Dehra the planters all use mango wood, because nearly all their tea goes to the Commissariat Department, and the Military Department insists on mango wood, as the wood of the old boxes can be utilised.